Vol. 1084 Number 3

OFFICIAL GAZETTE

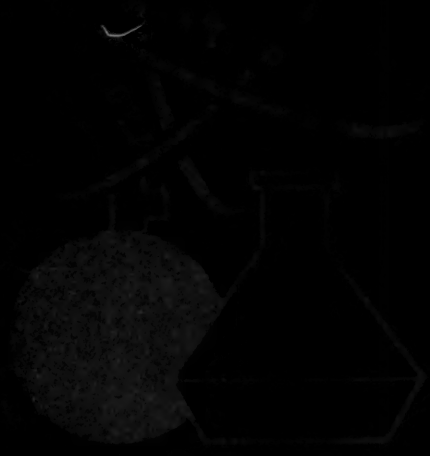
of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

November 17, 1987



U.S.
DEPARTMENT
OF COMMERCE

Patent
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Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

November 17, 1987 Volume 1084 Number 3

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $6.00 each; copies of TRADEMARKS at $1.50 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1076 O.G. 3 on Mar. 3, 1987.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

Certain domestic PCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

Domestic PCT Fees for Chapter II, effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar with regard to the German Mark as of Apr. 1, 1987 and was announced in the *Official Gazette* at 1077 O.G. 3 on Apr. 7, 1987.

International PCT fees were changed due to differences in the exchange rate and International PCT Chapter II fees effective July 1, 1987 were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987.

The national fees effective July 1, 1987 for entering the U.S. Patent and Trademark Office as a designated or elected Office as announced in the *Official Gazette* at 1079 O.G. 32, on June 16, 1987 are included for convenience of applicants.

The current schedule of PCT fees is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office as Searching Authority (ISA)	
—No corresponding prior U.S. national application filed:	520.00
—Corresponding prior U.S. national application filed:	350.00
—Supplemental search fee, per additional invention	140.00
European Patent Office as Searching Authority	1180.00
Preliminary examination fee	
U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as Searching Authority	370.00
—Additional examination fee, per additional invention	125.00
—Searching Authority not the USPTO	570.00
—Additional examination fee, per additional invention	190.00
International fees	
Basic fee:	485.00
Basic Supplemental fee (for each page over 30):	10.00
Designation fee for the first 10 national or regional offices:	120.00
Designation fee for 11th and subsequent designations:	No Charge
Handling fee	150.00
Supplement to the handling fee	150.00

U.S. National Stage fees

	Small Entity	Non-Small Entity
U.S. Patent and Trademark Office was Preliminary Examining Authority (IPEA)	150.00	300.00
USPTO was ISA but not IPEA	170.00	340.00
USPTO was neither ISA nor IPEA	225.00	450.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(1) to (4)	25.00	50.00
—For each independent claim in excess of 3	17.00	34.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	55.00	110.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1	55.00	110.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1	26.00	26.00

June 2, 1987.

DONALD J. QUIGG,
Assistant Secretary and Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct. 5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on November 13, 1984, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,481,679 through 4,483,018
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and

(h), as amended effective Oct. 5, 1985, which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)) . . . . . $ 225.00
By other than a small entity . . . . . $ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . $ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity (§1.9(f)) . . . . . $ 55.00
By other than a small entity . . . . . $ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98–622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . $ 500.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED AUGUST 30, 1987, DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,400,830	06/422,550	8/30/83
4,400,837	06/290,614	8/30/83
4,400,840	06/247,665	8/30/83
4,400,847	06/288,086	8/30/83
4,400,849	06/344,804	8/30/83
4,400,855	06/273,966	8/30/83
4,400,859	06/219,529	8/30/83
4,400,881	06/230,044	8/30/83
4,400,900	06/308,383	8/30/83
4,400,901	06/290,154	8/30/83
4,400,902	06/267,009	8/30/83
4,400,905	06/311,780	8/30/83
4,400,907	06/312,734	8/30/83
4,400,908	06/363,437	8/30/83
4,400,912	06/330,947	8/30/83
4,400,916	06/305,034	8/30/83
4,400,918	06/326,155	8/30/83
4,400,926	06/294,972	8/30/83
4,400,932	06/378,323	8/30/83
4,400,936	06/219,940	8/30/83
4,400,950	06/278,234	8/30/83
4,400,955	06/312,463	8/30/83
4,400,959	06/255,481	8/30/83
4,400,962	06/300,913	8/30/83
4,400,970	06/305,082	8/30/83
4,400,975	06/267,498	8/30/83
4,400,977	06/234,054	8/30/83
4,400,978	06/298,507	8/30/83
4,400,987	06/218,643	8/30/83
4,401,002	06/346,420	8/30/83
4,401,003	06/299,056	8/30/83
4,401,006	06/290,115	8/30/83
4,401,007	06/409,810	8/30/83
4,401,013	06/258,626	8/30/83
4,401,014	06/323,679	8/30/83
4,401,015	06/248,368	8/30/83
4,401,017	06/398,751	8/30/83
4,401,018	06/263,365	8/30/83
4,401,030	06/273,510	8/30/83
4,401,037	06/298,544	8/30/83
4,401,043	06/410,672	8/30/83
4,401,045	06/440,054	8/30/83
4,401,046	06/290,062	8/30/83
4,401,048	06/359,189	8/30/83
4,401,050	06/306,970	8/30/83
4,401,053	06/284,393	8/30/83
4,401,059	06/290,399	8/30/83
4,401,060	06/333,450	8/30/83
4,401,083	06/243,093	8/30/83
4,401,091	06/286,568	8/30/83
4,401,094	06/253,378	8/30/83
4,401,095	06/237,841	8/30/83
4,401,096	06/424,255	8/30/83
4,401,097	06/275,626	8/30/83
4,401,098	06/252,201	8/30/83
4,401,100	06/259,988	8/30/83
4,401,102	06/255,689	8/30/83
4,401,104	06/236,121	8/30/83
4,401,105	06/304,877	8/30/83
4,401,106	06/273,432	8/30/83
4,401,109	06/248,952	8/30/83
4,401,117	06/236,707	8/30/83
4,401,133	06/268,058	8/30/83
4,401,139	06/250,005	8/30/83
4,401,141	06/301,054	8/30/83
4,401,142	06/259,326	8/30/83
4,401,146	06/235,364	8/30/83
4,401,164	06/256,999	8/30/83
4,401,165	06/255,859	8/30/83
4,401,168	06/281,690	8/30/83
4,401,169	06/292,270	8/30/83
4,401,170	06/303,892	8/30/83
4,401,177	06/381,564	8/30/83
4,401,186	06/340,927	8/30/83
4,401,208	06/253,411	8/30/83
4,401,209	06/303,730	8/30/83
4,401,215	06/337,029	8/30/83
4,401,230	06/385,477	8/30/83
4,401,234	06/269,424	8/30/83
4,401,240	06/236,769	8/30/83
4,401,242	06/255,642	8/30/83
4,401,245	06/285,631	8/30/83
4,401,246	06/226,028	8/30/83
4,401,266	06/308,448	8/30/83
4,401,282	06/290,072	8/30/83
4,401,287	06/289,110	8/30/83
4,401,292	06/340,951	8/30/83

Patent Number	Serial Number	Issue Date
4,401,300	06/332,739	8/30/83
4,401,303	06/357,305	8/30/83
4,401,310	06/286,460	8/30/83
4,401,314	06/225,655	8/30/83
4,401,315	06/291,190	8/30/83
4,401,322	06/244,025	8/30/83
4,401,324	06/236,731	8/30/83
4,401,332	06/226,954	8/30/83
4,401,333	06/297,914	8/30/83
4,401,341	06/242,278	8/30/83
4,401,342	06/315,426	8/30/83
4,401,343	06/235,686	8/30/83
4,401,345	06/370,607	8/30/83
4,401,346	06/245,311	8/30/83
4,401,350	06/310,946	8/30/83
4,401,351	06/305,940	8/30/83
4,401,354	06/280,927	8/30/83
4,401,368	06/309,659	8/30/83
4,401,375	06/314,714	8/30/83
4,401,383	06/311,904	8/30/83
4,401,398	06/266,967	8/30/83
4,401,405	06/218,439	8/30/83
4,401,408	06/290,463	8/30/83
4,401,413	06/271,676	8/30/83
4,401,438	06/344,884	8/30/83
4,401,441	06/327,210	8/30/83
4,401,450	06/301,261	8/30/83
4,401,455	06/309,326	8/30/83
4,401,457	06/422,773	8/30/83
4,401,458	06/323,019	8/30/83
4,401,467	06/216,246	8/30/83
4,401,469	06/241,657	8/30/83
4,401,471	06/332,235	8/30/83
4,401,473	06/351,576	8/30/83
4,401,475	06/411,301	8/30/83
4,401,476	06/283,363	8/30/83
4,401,508	06/436,946	8/30/83
4,401,519	06/238,267	8/30/83
4,401,529	06/380,154	8/30/83
4,401,530	06/306,071	8/30/83
4,401,536	06/227,752	8/30/83
4,401,537	06/280,108	8/30/83
4,401,553	06/418,274	8/30/83
4,401,562	06/244,518	8/30/83
4,401,564	06/327,097	8/30/83
4,401,568	06/334,127	8/30/83
4,401,574	06/285,297	8/30/83
4,401,583	06/391,587	8/30/83
4,401,595	06/312,658	8/30/83
4,401,599	06/378,941	8/30/83
4,401,600	06/294,253	8/30/83
4,401,602	06/373,780	8/30/83
4,401,603	06/394,253	8/30/83
4,401,604	06/309,328	8/30/83
4,401,607	06/248,707	8/30/83
4,401,620	06/240,066	8/30/83
4,401,623	06/284,303	8/30/83
4,401,624	06/355,493	8/30/83
4,401,632	06/348,118	8/30/83
4,401,636	06/346,855	8/30/83
4,401,639	06/391,752	8/30/83
4,401,644	06/292,259	8/30/83
4,401,653	06/241,867	8/30/83
4,401,667	06/323,432	8/30/83
4,401,671	06/347,655	8/30/83
4,401,684	06/307,699	8/30/83
4,401,688	06/252,132	8/30/83
4,401,698	06/331,960	8/30/83
4,401,699	06/291,326	8/30/83
4,401,701	06/393,373	8/30/83
4,401,704	06/390,414	8/30/83
4,401,707	06/328,320	8/30/83
4,401,728	06/243,518	8/30/83
4,401,737	06/291,244	8/30/83
4,401,750	06/321,768	8/30/83
4,401,751	06/306,221	8/30/83
4,401,761	06/352,499	8/30/83
4,401,767	06/355,719	8/30/83
4,401,809	06/365,124	8/30/83
4,401,810	06/300,326	8/30/83
4,401,833	06/315,767	8/30/83
4,401,836	06/355,626	8/30/83
4,401,843	06/249,640	8/30/83
4,401,853	06/410,313	8/30/83
4,401,862	06/268,465	8/30/83
4,401,864	06/268,908	8/30/83
4,401,878	06/248,844	8/30/83
4,401,880	06/322,845	8/30/83
4,401,882	06/296,091	8/30/83
4,401,889	06/249,119	8/30/83
4,401,894	06/220,257	8/30/83
4,401,911	06/239,642	8/30/83
4,401,912	06/260,245	8/30/83
4,401,914	06/230,847	8/30/83
4,401,920	06/262,685	8/30/83
4,401,936	06/224,654	8/30/83
4,401,944	06/237,115	8/30/83
4,401,958	06/308,460	8/30/83
4,401,978	06/259,373	8/30/83
4,401,989	06/399,286	8/30/83
4,401,994	06/341,228	8/30/83
4,402,005	06/298,270	8/30/83
4,402,009	06/252,150	8/30/83
4,402,012	06/321,890	8/30/83
4,402,024	06/302,376	8/30/83
4,402,062	06/263,355	8/30/83
4,402,072	06/258,758	8/30/83

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

4,555,299, Re. S.N. 101,643, Filed Sept. 28, 1987, Cl. 156/552, LITERATURE APPLYING MECHANISM, Helmut Voltmer, et al., Owner of Record: *NJM, Inc., Fairfield, N.J.,* Attorney or Agent: Charles E. Baxley, Ex. Gp.: 131

4,584,434, Re. S.N. 088,044, Filed Aug. 17, 1987, Cl. 379/102, REMOTE CONTROL DEVICE USING TELEPHONE CIRCUIT OF ELECTRIC APPARATUS, Kazuo Hashimoto, Owner of Record: *Hashimoto Corp., Tokyo, Japan,* Attorney or Agent: Allan M. Lowe, et al., Ex. Gp.: 261

4,600,531, Re. S.N. 101,502, Filed Sept. 28, 1987, Cl. 530/385, PRODUCTION OF ALPHA-ALPHA CROSS-LINKED HEMOGLOBINS IN HIGH YIELD, Joseph A. Walder, Owner of Record: *University of Iowa Research Foundation, Gilmore Hall, Iowa,* Attorney or Agent: Donald L. Zarley, Ex. Gp.: 153

4,610,644, Re. S.N. 102,436, Filed Sept. 29, 1987, Cl. 474/82, DERAILLEUR FOR A BICYCLE, Masashi Nagano, Owner of Record: *Shimano Industrial Co., Ltd., Osaka, Japan,* Attorney or Agent: Ellsworth H. Mosher, et al., Ex. Gp.: 356

4,610,753, Re. S.N. 101,644, Filed Sept. 28, 1987, Cl. 156/552, LITERATURE APPLYING MECHANISM, Helmut Voltmer, et al., Owner of Record: *NJM, Inc., Fairfield, N.J.,* Attorney or Agent: Charles E. Baxley, Ex. Gp.: 131

4,627,270, Re. S.N. 101,239, Filed Sept. 25, 1987, Cl. 73/38, SYSTEM FOR MEASURING THE PORE VOLUME AND PERMEABILITY OF VERY TIGHT CORE PLUGS AND METHOD THEREFOR, Stanley C. Jones, Owner of Record: *Marathon Oil Co., Findlays, Ohio,* Attorney or Agent: Jack L. Hummel, et al., Ex. Gp.: 265

4,652,695, Re. S.N. 095,874, Filed Sept. 14, 1987, Cl. 174/035 OGC, MESH-COVERED CORE STRIP FOR HIGH FREQUENCY RFI/EMI RADIATION SHIELDING, Robert B. Busby, Owner of Record: *Pawling Corp., Pawling, N.Y.,* Attorney or Agent: Fritz L. Schweitzer, Jr., et al., Ex. Gp.: 215

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

4,244,897, Reexam. No. 90/001,353, Requested: Oct. 15, 1987, Cl. 264/40.2, METHOD AND APPARATUS TO CONTROL THE DENSITY OF PRODUCTS PRODUCED FROM AN EXTRUSION PROCESS, William S. Moon, Owner of Record: *Measurex Corp., Cupertino, Calif.,* Attorney or Agent: Spensley, Horn, et al., Ex. Gp.: 130, Requester: Owner

4,456,590, Reexam. No. 90/001,352, Requested: Oct. 16, 1987, Cl. 424/121, HEAT TREATMENT OF LYOPHILIZED BLOOD CLOTTING FACTOR VIII CONCENTRATE, Alan Rubinstein, Owner of Record: *Cedars-Sinai Medical Ctr., Los Angeles, Calif.,* Attorney or Agent: Lyon & Lyon, Ex. Gp.: 120, Requester: Louis Gubinsky, Washington, D.C.

4,505,620, Reexam. No. 90/001,351, Requested: Oct. 9, 1987, Cl. 405/224, FLEXIBLE OFFSHORE PLATFORM, Bernard Andrier, Owner of Record: *Entrepose G.T.M. pour les Petroliers Maritimes ETPM, Montreuil, France,* Attorney or Agent: Amster, Rothstein, et al., Ex. Gp.: 350, Requester: Owner

4,626,441, Reexam. No. 90/001,350, Requested: Oct. 15, 1987, Cl. 426/548, DIETETIC FROZEN DESSERTS CONTAINING ASPARTAME, Melvin Wolkstein, Owner of Record: *Inventor, S. Orange, N.J.,* Attorney or Agent: Unknown, Ex. Gp.: 130, Requester: Nicholas J. Aquilino, Arlington, Va.

Erratum

"All reference to Patent No. 4,660,417 to E. Marston Moffatt and Richard E. Swarts of Conn., for 'IMPULSE JET PUMP', appearing in the Official Gazette of Apr. 28, 1987, should be deleted since no patent was granted."

PATENT NOTICES

Certificates of Correction for the Week of Nov. 17 1987

B1. 4,491,088	4,642,309	4,665,551	4,675,119
PP. 5,948	4,642,561	4,665,554	4,675,696
D. 290,631	4,643,672	4,665,739	4,675,699
4,289,616	4,646,240	4,666,100	4,675,882
4,490,787	4,647,024	4,666,564	4,676,070
4,492,983	4,647,342	4,666,681	4,676,418
4,529,787	4,648,901	4,666,767	4,676,631
4,534,406	4,648,991	4,667,044	4,676,683
4,535,042	4,649,343	4,667,630	4,676,904
4,543,719	4,649,533	4,667,703	4,677,125
4,558,149	4,649,835	4,667,943	4,677,284
4,561,190	4,649,965	4,668,055	4,677,448
4,561,688	4,650,154	4,668,437	4,677,474
4,581,767	4,650,176	4,668,553	4,677,567
4,582,694	4,650,643	4,669,903	4,677,851
4,588,296	4,652,052	4,669,990	4,677,976
4,588,496	4,652,606	4,670,091	4,678,022
4,589,621	4,653,665	4,670,219	4,678,535
4,603,119	4,654,356	4,670,286	4,678,899
4,610,514	4,656,267	4,670,596	4,679,073
4,611,330	4,656,676	4,670,660	4,679,074
4,614,868	4,658,948	4,670,711	4,679,103
4,619,702	4,659,146	4,670,946	4,679,598
4,621,001	4,659,645	4,671,268	4,679,727
4,622,119	4,659,926	4,671,337	4,679,804
4,623,549	4,660,194	4,671,673	4,680,129
4,623,562	4,660,210	4,671,729	4,680,259
4,627,910	4,660,756	4,671,907	4,680,803
4,629,320	4,660,777	4,672,091	4,681,270
4,634,762	4,660,997	4,672,214	4,681,398
4,636,575	4,661,753	4,672,850	4,681,513
4,638,011	4,662,735	4,673,048	4,681,579
4,639,136	4,662,930	4,673,281	4,682,039
4,639,519	4,664,186	4,673,612	4,682,120
4,640,536	4,664,314	4,674,104	4,682,890
4,642,034	4,664,540	4,674,863	4,685,132
4,642,247	4,664,751	4,674,893	

Disclaimer

4,601,530.—*Daniel R. Coldren,* Enola; *Wayne S. Davis,* Harrisburg; and *Jon A. Fortuna,* New Cumberland, all of Pa. Patent dated July 22, 1986. Disclaimer filed Aug. 4, 1987, by the assignee, *AMP Inc.*

Hereby enters this disclaimer to claims 13, 14, and 16 of said patent.

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	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
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	Springfield: Illinois State Library	(217) 782-5430
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	Boston Public Library	(617) 536-5400 Ext. 265
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	Detroit Public Library	(313) 833-1450
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	St. Louis Public Library	(314) 241-2288 Ext. 390
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New Hampshire	Durham: University of New Hampshire Library	(603) 862-1777
New Jersey	Newark Public Library	(201) 733-7815
New Mexico	Albuquerque: University of New Mexico Library	(505) 277-5441
New York	Albany: New York State Library	(518) 474-7040
	Buffalo and Erie County Public Library	(716) 846-7101
	New York Public Library (The Research Libraries)	(212) 714-8529
North Carolina	Raleigh: D. H. Hill Library, N.C. State University	(919) 737-3280
Ohio	Cincinnati & Hamilton County, Public Library of	(513) 369-6936
	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 292-6286
	Toledo/Lucas County Public Library	(419) 255-7055 Ext. 212
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Oregon	Salem: Oregon State Library	(503) 378-4239
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	Pittsburgh: Carnegie Library of Pittsburgh	(412) 622-3138
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	Nashville: Vanderbilt University Library	(615) 322-2775
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	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-2551
	Dallas Public Library	(214) 670-1468
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext. 2587
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Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Library, University of Wisconsin	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247

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*Collection organized by subject matter.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

JAMES E. DENNY, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF October 10, 1987

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	8-05-86
ORGANIC CHEMISTRY AND BIOTECHNOLOGY, GROUP 120—C. E. VAN HORN, Director	2-15-85
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	1-27-87
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	1-29-86
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director	2-18-86
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	10-14-85
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director	1-07-85
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director	5-21-85
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	9-06-85
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director	2-20-86
DESIGN, GROUP 290—K. L. CAGE, Director	1-18-85
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	9-12-86
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—S. N. ZAHARNA, Director	10-04-85
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—R. E. AEGERTER, Director	10-15-85
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director	12-29-86
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	1-02-87

Expiration of patents: The patents within the range of numbers indicated below expire during October 1987, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,531,806 to 3,537,106, inclusive

Plant Patents ..... Numbers 2,991 to 2,995 inclusive

REEXAMINATIONS

NOVEMBER 17, 1987

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 4,511,666 (785th)
PROCESS FOR PRODUCING BETA'-SILICON ALUMINUM OXYNITRIDE(B'-SiAlON)
Frankie E. Phelps, Lower Burrell; Paul J. Boget, and Robert L. Troup, both of Murrysville, all of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.
Reexamination Request No. 90/001,027, Jun. 10, 1986.
Reexamination Certificate for Patent No. 4,511,666, issued Apr. 16, 1985, Ser. No. 450,337, Dec. 16, 1982.
Int. Cl.[4] C04B *35/58*
U.S. Cl. 501—98

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim **1** is cancelled.

Claims **2–10** are determined to be patentable as amended.

New claim **11** is added and determined to be patentable.

11. A process for producing an essentially beta'-SiAlON refractory material, comprising:
providing a uniform mixture of initial reactant materials as sources of SiO_2, Al_2O_3 and C;
molding the mixture of the initial reactant materials;
nitriding said molded mixture in a reactor at temperatures between 1200° C. and 1450° C. for a time sufficient to convert at least a portion of said initial reactants into at least a portion of effective reactants; and
without compacting said effective reactants after the nitriding step, heating them in the presence of nitrogen at temperatures higher than the nitriding temperatures from 1400° C. to 1650° C. for a time sufficient to convert said effective reactants to an essentially beta'-SiAlON refractory material.

REISSUES

NOVEMBER 17, 1987

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 32,545

MAGNETIC DOMAIN LOGIC DEVICE

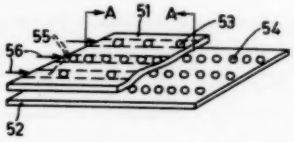
Jan W. F. Dorleijn; Willem F. Druyvesteyn, and Frederik A. De Jonge, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Original No. 3,944,842, dated Mar. 16, 1976, Ser. No. 478,575, Jun. 12, 1974. Continuation of Ser. No. 277,150, Aug. 2, 1972, abandoned. Application for reissue Oct. 20, 1977, Ser. No. 844,109

Claims priority, application Netherlands, Aug. 3, 1971, 7110674

Int. Cl.[4] G11C *19/08*

U.S. Cl. 365—32 **13 Claims**



4. A magnetic device comprising a first plate of a magnetic material in which at least one domain is present, a domain guiding structure having a plurality of guiding paths for the displacement of domains in the first plate, and a second plate of magnetic material completely filled with domains, said second domain covering, at least in projection, at least a part of the first plate, an interaction force occurring between at least one domain in the first and one domain in the second plate, the domains in the second plate creating stable positions for the domains in the first plate.

PATENTS

GRANTED NOV. 17, 1987

ERRATA

For CLASS	See PATENT NO.
437-225	4,706,374
437-004	4,706,376
437-024	4,706,377
073-049	4,706,482
016-112	4,706,598
450-114	4,706,675
222-526	4,706,874
206-626	4,706,875
241-188	4,706,903
242-055	4,706,904
242-068	4,706,905
242-086	4,706,906
297-379	4,707,010
439-075	4,707,039
439-510	4,707,040
439-131	4,707,041
439-140	4,707,042
439-142	4,707,043
439-289	4,707,044
439-588	4,707,045
439-314	4,707,046
439-271	4,707,047
439-620	4,707,048
439-620	4,707,049
439-747	4,707,050
439-781	4,707,051
439-844	4,707,052
354-266	4,707,127
437-189	4,707,197
208-057	4,707,245
208-251	4,707,246
512-011	4,707,302
503-209	4,707,463
503-216	4,707,464
361-176	4,707,780
340-825	4,707,804
364-414	4,707,822
374-014	4,707,840
178-019	4,707,845

PATENTS

GRANTED NOV. 17, 1857

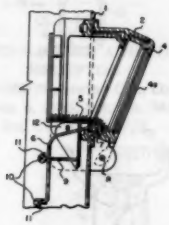
TOBACCO

PATENTS

GRANTED NOVEMBER 17, 1987

GENERAL AND MECHANICAL

4,706,301
BITE OPERATED VIEWPORT
Jefferson H. Page, Rte. 1, Box 31B, Autryville, N.C. 28318
Filed Jul. 3, 1986, Ser. No. 881,852
Int. Cl.[4] A61F *9/06*
U.S. Cl. 2—8 **1 Claim**



1. In a welder's protective face mask including an opening defining a field of view for the wearer,

(a) a door provided with a semitransparent window and means including a hinge adjacent the lower side of said door for supporting said door on the mask for movement between a closed position covering said opening, wherein the upper edge of said door is further from the outside front surface of the mask than the lower edge, and an open position exposing said opening,

(b) means resiliently biasing said door to its closed position,

(c) an upper bite pad secured to and disposed inside the mask in position for engagement by the upper front teeth of the wearer, and

(d) a lower bite pad provided with means supporting it inside the mask below said upper bite pad for engagement by the lower front teeth of the wearer,

(e) said last mentioned supporting means including a movable link connecting said lower bite pad to said door for upward movement toward said upper bite pad in opposition to said biasing means for opening said door in response to jaw closure movement of the wearer.

4,706,302
COMFORT PAD
Barbara J. Padfield, 750 Somerville St., Manchester, N.H. 03103, and George Spector, 233 Broadway, Rm 3815, New York, N.Y. 10007
Filed Sep. 4, 1986, Ser. No. 904,111
Int. Cl.[4] A41D *13/06*
U.S. Cl. 2—22 **5 Claims**

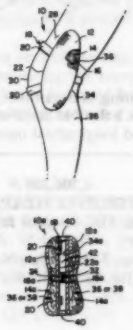
1. A comfort pad comprising:

(a) a pillow with opposite sides having a hollow chamber within;

(b) cushioning material placed within said hollow chamber of said pillow;

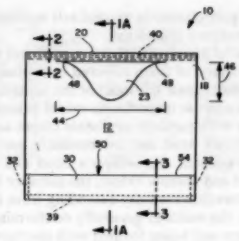
(c) a Y-shaped strap having two arms extending from one of said sides of said pillow and an attachable single terminal strap extending from said arms to the opposite of said sides to wrap around a leg of a person at side of a knee thereof and be secured thereat;

(d) means for securing said terminal end directly to said opposite side of said pillow so that said pillow will stay in



place between knees of said person to relieve pressure on knee bones as well as stress on hips.

4,706,303
DISPOSABLE BIB WITH AN ELASTICIZED NECKBAND
Paul T. Van Gompel, Hortonville; Jody D. Suprise, and Jacqueline A. Gross, both of Neenah, all of Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.
Continuation-in-part of Ser. No. 887,585, Jul. 16, 1986, abandoned. This application Oct. 28, 1986, Ser. No. 923,945
Int. Cl.[4] A41B *13/10*
U.S. Cl. 2—49 R **17 Claims**



1. A protective garment, comprising:

a base sheet member which has a neck opening aperture formed in a selected neckband section thereof;

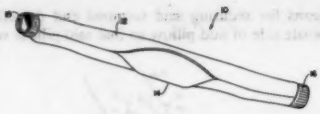
a neck elastic member located in an overlying relation with a selected portion of said neckband section and positioned at least partially adjacent to said neck opening aperture;

attaching means for securing said elastic member to said neckband section.

4,706,304
TUBULAR GARMENT
David J. Jones, 3221 Basin, Cheyenne, Wyo. 82009
Filed Nov. 3, 1986, Ser. No. 926,097
Int. Cl.[4] A41D *23/00*
U.S. Cl. 2—91 **9 Claims**

1. An elongated, tubular, flexible garment having a length in the range of about 30 to 90 inches and a diameter in the range of about 3 to 12 inches, wherein the ends of said garment are open, wherein said garment includes a wall having a centrally

located longitudinal opening therein, said opening having a length in the range of about 12 to 30 inches; wherein said garment is adapted to fit over the arms and across the shoulders of a person wearing said garment; and wherein said garment further includes a flexible hood member attached to said garment adjacent said longitudinal opening.

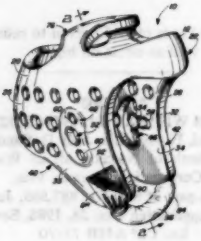


4,706,305

PROTECTIVE HEADGEAR

Soo S. Cho, Roseland, Fla., assignor to Macho Products, Inc., Palm Bay, Fla.

Filed Sep. 5, 1986, Ser. No. 903,651
Int. Cl.[4] A63B *71/10*
U.S. Cl. 2—425 **7 Claims**



1. For use by participants in martial arts activities or the like, an improved headgear including:

a circumferential member with a top edge and with a bottom edge and formed of foam covered by a pliable casing and shaped to encompass the head of the wearer, the member including a narrow imperforate extent across the wearer's forehead, a wide partially perforate extent across the back of the wearer's head and intermediate perforate extents across the sides of the wearer's head and coupling the wide extent and narrow extent, the member also including ear protectors downwardly extending from the intermediate extents, the member generally conforming to the head of the wearer and being formed with apertures for providing ventilation to the wearer, the member also including an imperforate area formed in the interior of the wide extent and shaped to form a concave region of entrapped air to absorb the force of a blow to the back of the head of a wearer;

support means extending between and coupling opposed intermediate extents at top edge thereof; and

a chin strap extendable beneath the chin of a wearer for releasably coupling the ear protectors.

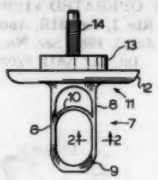
4,706,306

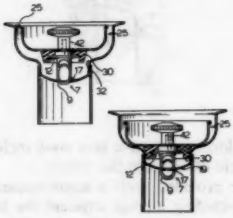
SINK STRAINER WITH BRIDGED STEM

Ronald A. Smith, 4784 Owl Circle, Mississauga, Ont., Canada L5Z4 1Z2

Filed Mar. 9, 1987, Ser. No. 23,268
Int. Cl.[4] A47K *1/14*; E03C *1/26*
U.S. Cl. 4—286 **10 Claims**

1. A unitary stem for use with a drain stopper for a fixture, said stem having an upper spindle portion including attachment means for securing the stem to said stopper, an intermediate flange extending transversely of the stem and a lower hollow stem portion bounded by leg portions extending downwardly, having a radiused nose portion at the lower end junction thereof, said legs being transversely flexible intermediate their ends, in use, during insertion and withdrawal of the stem from a guidance aperture of a drain housing, and spring means extending across said hollow stem portion in joining relation with said leg portions intermediate their ends, to resist transverse compressive deformation of said leg portions on passage thereof through said guidance aperture.



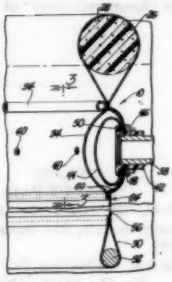


4,706,307

FLOATING POOL ASSEMBLY

John L. Smith, 3775 Kent Dr., Troy, Mich. 48084

Continuation of Ser. No. 207,922, Nov. 18, 1980, abandoned. This application May 4, 1983, Ser. No. 489,140
Int. Cl.[4] E04H *3/18*
U.S. Cl. 4—487 **19 Claims**



1. A floating pool assembly **(10)** comprising; sheet means **(24)** having first and second ends and top and bottom extremities, said sheet means **(24)** being flexible for folding and unfolding; flexible floatation means **(26)** extending along said top extremity between said ends of said sheet means **(24)** for providing buoyancy, said sheet means **(24)** defining a fluid pocket **(34)** extending between said ends below said floatation means **(26)**, said fluid pocket **(34)**, having closed ends and spaced openings **(40)** therealong; a fluid pocket inlet **(42)** communicat-

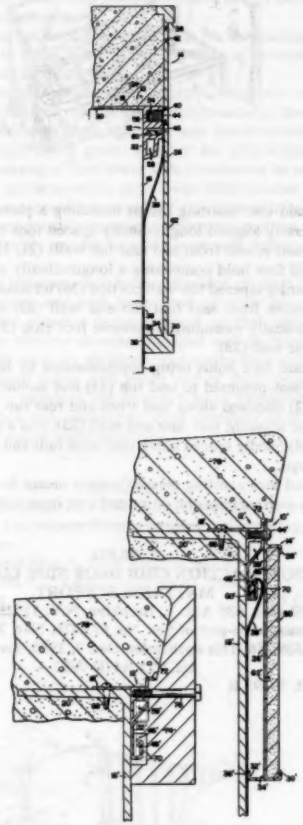
ing with said fluid pocket (34) for supplying fluid to said fluid pocket (34) for flow out of said openings (40); connecting means (52) at said first and second ends for connecting said first and second ends together to define an endless wall with an open top and an open bottom; and shaping means (54) having a predetermined shape coacting with said sheet means (24) and said floatation means (26) for maintaining said floatation means (26) in said predetermined shape about the periphery of said top extremity and for allowing said sheet means (24) to freely depend from said floatation means (26) about the periphery thereof.

4,706,308

SWIMMING POOL LINER AND TILE BORDER RECEPTOR

George D. Palmere, 6300 Nightwind Cir., Orlando, Fla. 32818

Filed Jun. 4, 1985, Ser. No. 741,128
Int. Cl.[4] E04H *3/18*
U.S. Cl. 4—496 6 Claims



1. A pool edge forming apparatus for minimizing solar exposure of plastic used with in-ground vinyl liner swimming pools of the type having at least one layer of poured concrete decking, the apparatus comprising:

(A) a tile setting track having a substantially flat tile backing surface and upper and lower tile retaining lips;

(B) a liner receptor having a first leg for extending horizontally outward from a top planel of a pool and a body segment extending vertically downward from an end of the first leg adjacent the top panel, the body segment including a liner receiver slot for receiving and retaining an upper edge of a vinyl liner and a track receiving means for attachment of the tile setting track, said receptor being maintained in fixed position about the pool by an overlaying of the at least one layer of poured concrete decking; and

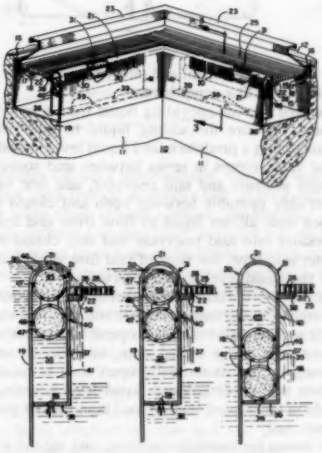
(C) means for attaching said tile setting track to said liner receptor, said track covering the receptor body segment and at least that portion of the vinyl liner normally above water and said track being protected from solar rays by tile inserted therein.

4,706,309

AUTOMATIC RIM FLOW WATER LEVEL CONTROL SYSTEM FOR GUTTERS

William A. van den Broek, Philadelphia, Pa., assignor to KDI Sylvan Pools, Inc., Doylestown, Pa.

Continuation-in-part of Ser. No. 817,028, Jan. 8, 1986, abandoned. This application Dec. 1, 1986, Ser. No. 936,165
Int. Cl.[4] E04H *3/19*
U.S. Cl. 4—508 5 Claims



1. An automatic rim flow water level control system for swimming pools gutters which is responsive to the level of water in the pool, said pool including a perimeter gutter having a front wall with a rim, which system comprises

at least one weir chamber open at the top and engaged with the front wall of the gutter,

a plurality of vertical elongated water entrance openings through the front wall of the gutter,

a plurality of vertical elongated water exit openings through the rim of the gutter behind the front wall slots,

said weir chamber having a rear wall,

a plurality of vertically elongated water exit openings in said chamber rear wall,

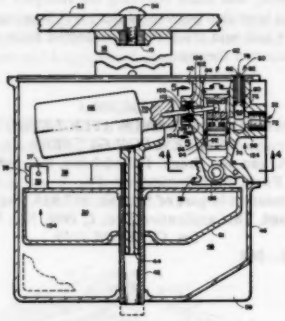
said weir chamber having a horizontal bottom wall,

said chamber having vertical end walls connected to said rear float carried in said weir chamber, said float's position in said chamber being responsive only to said pool water level, and thereby determining the flow of water into said entrance slots and out said exit slots into said gutter for removal, and said bottom wall, and

controlled water leakage means in said bottom wall to per-

mit water to exit said gutter below said float to prevent said float from becoming water bound.

4,706,310
LIQUID LEVEL CONTROL SYSTEM
Herbert Magnes, 2611 Obelisco Place, Carlsbad, Calif. 92008
Filed Oct. 23, 1986, Ser. No. 922,414
Int. Cl.[4] E04H *3/18*
U.S. Cl. 4—508 **18 Claims**



1. A liquid level control and safety fill system for use with a reservoir or the like comprising:

liquid feed line for providing liquid from a source of liquid under pressure for adding liquid to said reservoir for maintaining a predetermined liquid level in said reservoir;

a first valve means in series between said source of liquid under pressure and said reservoir, said first valve means rotatably operable between open and closed states, said open state allows liquid to flow from said source under pressure into said reservoir and said closed state terminates said flow, the state of said first valve is determined by the liquid level in said reservoir;

a second valve means is connected in series between said source of liquid under pressure and said first valve means, said second valve means is operable between a normally open state and a closed state, said second valve means changes from its normally open state to its closed state when said predetermined liquid level is exceeded and is held in said closed state by said liquid under pressure until reset; and

reset means for manually resetting said second valve means from a closed state to an open state, said reset means is positioned in a series between said liquid under pressure and said second valve means, when activated said reset means seals said liquid under pressure from entering said second valve means and vents the liquid under pressure trapped between said reset means and said second valve means to atmosphere causing said second valve means to change from a closed state to its normally open state when said liquid level in said reservoir is at or below said predetermined level.

4,706,311
BATHTUB UNIT WITH IMPROVED USER FEATURES
Louis Jarosinski, 10457 Conrad St., Freedom, Wis. 54130
Filed May 15, 1986, Ser. No. 863,458
Int. Cl.[4] A61H *33/02*
U.S. Cl. 4—546 **7 Claims**

1. A bathing apparatus comprising, in combination:

(a) a bathtub unit (1) including a raised seat portion (12) and a downwardly recessed bathtub (13) disposed adjacent said seat portion (12), and with said bathtub unit (1) having a generally vertical front wall (17),

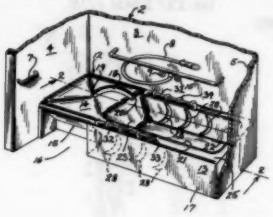
(b) said bathtub (13) having front and rear longitudinally extending interior walls (21, 22), a first interior end wall (23) disposed adjacent said seat portion (12) and a second interior end wall (24) disposed remote from said seat portion (12),

(c) a bather's seat (14) forming a part of said seat portion (12),

(d) recess means (16) disposed in said front wall (17) adjacent said seat (14) and providing a heel space for a forwardly facing seated user to bend his legs beneath,

(e) a water drain run comprising a groove (18) disposed in said seat (14), with said groove commencing adjacent the center (19) of said seat and curving arcuately rearwardly and terminating in an outlet (20) at said first tub end wall (23) for draining water into said tub (13),

(f) and means to assist the user in entering said tub (13) from a seated position on said seat (14),

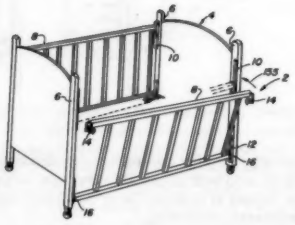


(g) said user assisting means including a plurality of transversely aligned longitudinally spaced foot holds (28) disposed in said front and rear tub walls (21, 22), and with a said foot hold comprising a longitudinally extending outwardly tapered tub wall portion (30) terminating at an end remote from said first tub end wall (23) in a generally vertically extending transverse foot stop (31) facing said first wall (23),

(h) said foot holds being complimented by hand-graspable means mounted to said tub (13) and including hand rails (32) disposed along said front and rear tub walls (21, 22) and adjacent said first end wall (23), and a series of rings (34) fixedly spaced along said hand rails and forming hand stops,

(i) said user assisting means forming means facilitating step-by-step incremental entry and exit from said tub (13).

4,706,312
DOUBLE ACTION CRIB DROP SIDE LOCK AND MATTRESS SUPPORT
Louis Shamie, 630 Ave. V, Brooklyn, N.Y. 11225
Continuation-in-part of Ser. No. 673,476, Nov. 20, 1984, Pat. No. 4,639,956. This application Oct. 7, 1986, Ser. No. 916,220
Int. Cl.[4] A47D *7/02*
U.S. Cl. 5—93 R **13 Claims**



1. A double action securing device in combination with a

crib including a crib frame and at least one drop side vertically movable with respect to the frame, comprising:

an elongated upper guide member connected to the crib frame on each side of the drop side, each upper guide member having at least one opening therein with a lower edge, and each upper guide member having a lower end;

an elongated lower guide member connected to the crib frame on each side of the drop side, each lower guide member being beneath and being aligned with one of said upper guide members, each lower guide member having a lower shoulder near a lower end thereof;

an upper slide member slideably engaged with each of said upper guide members, each upper slide member being connected to one side of the drop side;

a catch pin mounted for axial movement to each upper slide member, each catch pin having a head for engaging into said opening of said upper guide member on which said upper slide member is slideably mounted, each head having a recess for engaging onto said lower edge of said opening for precluding axial movement of said catch pin out of said opening;

biasing means connected to each catch pin for biasing each catch pin in a direction into said opening of its respective upper guide member; and

a lower slide member slideably engaged with each of said lower guide members, each lower slide member having a shoulder which is engagable with said lower shoulder of its respective lower guide member for precluding any further lowering of said lower slide member on its respective lower guide member, each lower slide member being pivotally connected to one side of said drop side below a respective upper slide member for permitting tilting of the drop side with respect to said upper and lower guide members;

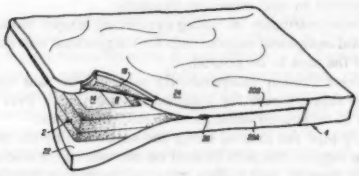
the distance between said lower shoulder of each lower guide member and said lower end of each respective upper guide member being selected so that with said lower slide member shoulder engaged with its respective lower guide member shoulder, said upper slide members are positioned below said lower end of their respective upper guide members, the drop side being thereafter raisable to slide and said upper slide members onto their respective upper guide members.

4,706,313

DECUBITUS ULCER MATTRESS

Mike Murphy, LaCrescent, Minn., assignor to Comfortex, Inc., Winona, Minn.

Filed May 1, 1986, Ser. No. 857,977
Int. Cl.[4] A47C *27/15;* A61G *7/04*
U.S. Cl. 5—464 **13 Claims**



1. A mattress comprising:

a first flexible and resilient body having a substantially flat top surface, said top surface having a plurality of recesses;

at least one flexible and resilient second body fittable in said at least one recess and being sized and shaped such that when fitted in said at least one recess, a surface of said second body is substantially coplanar with said substantially flat top surface, a number of said second bodies being fewer than that of said recesses such that at least open of said recesses is empty; and

an encasement member encasing said first and second resilient bodies, said encasement member including a waterproof and flame retardart top sheet covering said top surface, and a flexible and resilient foam sheet positioned between said top surface and said top sheet and attached to said encasement member adjacent edges of said top surface, said top sheet being dimensioned with respect to said resilient foam sheet such that said top sheet is bloused when said resilient foam sheet is laid taut on said top surface,

wherein said foam sheet has a thickness, density and ILD sufficient, when a patient is lying on said mattress, to avoid a feeling of falling into said empty recess and sufficient to avoid a cookie cutter effect around said empty recess.

4,706,314

PROTECTIVE CURL HAIR STYLE PILLOW CASE

Arie L. Grant, 1601 E. 35th St., Savannah, Ga. 31404

Continuation-in-part of Ser. No. 809,390, Mar. 17, 1986, Pat. No. 4,662,014. This application Feb. 5, 1987, Ser. No. 11,260
Int. Cl.[4] A47G *9/00*
U.S. Cl. 5—490 **2 Claims**

1. A pillowcase having a three-layered, machine washable, moisture proof inlay formed integrally into at least one of its sides so that when fitted around a pillow, maintenance of the curl hair style without a bonnet is allowed and prevention of soiling of the pillowcase outside of the inlaid areas by cosmetics, oils, greases, activators and moisturizers used in curl permanent waving is allowed, wherein said inlay comprises:

a top layer of smooth, low friction polyester material treated with a fabric fluoridizor sold under the trademark ZEPEL, said treated polyester material adopted to repel some moisture, thus keeping it in the hair;

a center polyester matting cushioning layer; and a waterproof bottom layer of a rubberized flannelette material;

said layers being stitched together and said inlay stitched into at least one of the sides of said pillowcase.

4,706,315

PROCESS FOR THE TREATMENT OF KNITWARE

Leon von Ondarza, Aachen, Fed. Rep. of Germany, assignor to H. Krantz GmbH & Co., Aachen, Fed. Rep. of Germany

Filed Apr. 22, 1986, Ser. No. 854,986
Claims priority, application Fed. Rep. of Germany, Apr. 24, 1985, 3514735
Int. Cl.[4] D06B *5/18, 21/00*
U.S. Cl. 8—155.1 **7 Claims**

1. A process for the wet treatment, preliminary dewatering and drying of knitware, comprising the following steps:

(a) winding said knitware as a hose under constant winding tension to form a wound lap having a first axial length and a density of more than 200 and less than 400 g/dm^3,

(b) coaxially compressing said wound lap by at least 3% and at the most 8% of said first axial length for shortening said wound lap to a second axial length,

(c) flowing a dye liquor through said wound lap in its shortened state,

(d) preliminarily dewatering said wound lap, and

(e) drying the dewatered wound lap.

4,706,316
METHOD FOR PRODUCING FOOTWEAR

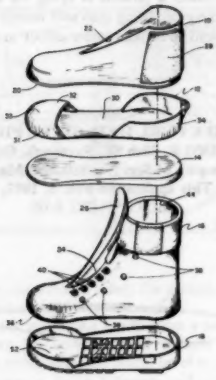
Giancarlo Tanzi, Via Cimitero, Vidor, Italy

Continuation of Ser. No. 802,572, Nov. 27, 1985, abandoned, which is a continuation-in-part of Ser. No. 696,958, Jan. 31, 1985, abandoned. This application Mar. 23, 1987, Ser. No. 29,146

Int. Cl.[4] A43D *3/12*; A43B *23/07*, *23/08*; A43C *13/14*

U.S. Cl. 12—142 T

5 Claims



1. A method for making footwear, comprising:

pre-forming an upper;

pre-forming a liner;

integrally forming together a sole, a toe counter and a heel counter to define a single piece midsole;

providing apparatus for supporting at least portions of the footwear, wherein said apparatus for supporting is used only as a support for portions of the footwear during the making thereof and wherein at least one of said pre-formed upper, said pre-formed liner, and said integrally formed midsole is used in defining at least one of the size and shape of the footwear during the making thereof;

placing at least portions of said liner in contact with portions of said midsole, wherein portions of said toe counter lie over portions of said liner and wherein said heel counter is positioned outwardly of portions of said liner;

forming a midsole/liner assembly using said midsole and said liner by attaching said midsole and said liner together;

providing an apparatus used for pulling said upper, said apparatus including first arm means and second arm means;

grasping said midsole using said first arm means of said apparatus for pulling;

after forming said midsole/liner assembly, pulling said upper outwardly of said midsole including said heel counter using said second arm means of said apparatus for pulling wherein said upper is tightly fitted with respect to said midsole/liner assembly;

using attaching means to attach said upper to said midsole; and

attaching a sole to said upper to form the footwear that includes said upper, said liner, said midsole and said sole.

4,706,317
CONCRETE TRAIN PAVING APPARATUS AND METHOD

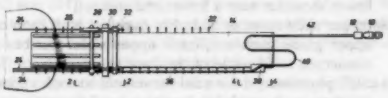
Eugene A. Horstketter, 400 Regentview Dr., Houston, Tex. 77079

Filed Oct. 10, 1986, Ser. No. 917,784

Int. Cl.[4] E01D *21/04*

U.S. Cl. 14—1

6 Claims



1. The method of automatedly pouring and finishing concrete slabs in place on a bridge, which comprises

establishing equipment support rails on stable overhang brackets located on either side of and outside of the slab area to be poured,

serially mounting a concrete distributor having an input hopper and a concrete finisher on said equipment support rails for suspension over and subsequent longitudinal movement with respect to the area to be poured,

establishing a rolling pipe rail on said stable overhang brackets outside of and parallel with one of said equipment support rails, said rolling pipe rail extending along a stable adjacent approach area to the area to be poured,

locating a concrete pump on said stable adjacent approach area to the area to be poured,

mounting a motor-driven tractor on said rolling pipe rail on the portion thereof extending along said stable adjacent approach area to the area to be poured,

installing a rolling pipe on said rolling pipe rail, its downstream end being attached to the hopper of said distributor and its upstream end being attached to said tractor, the length of said rolling pipe being sufficient to permit its downstream end to traverse the length of the area to be poured,

connecting the input upstream end of said rolling pipe at said tractor with said stationary pump using a serpentine hose, and

providing a controller at said hopper for regulating the advance of said tractor in accordance with the advance of said concrete distributor while delivering concrete to the area to be poured, the advance of the tractor pushing said rolling pipe forward while unwinding said serpentine hose.

3. Apparatus for effecting the automated pouring and finishing concrete slabs in place on a bridge, comprising

a plurality of stable overhang brackets located on either side of and outside of the slab area to be poured,

equipment support rails located along the attached to and supported by said overhang brackets,

a concrete distributor including a receiving hopper mounted on said equipment support rails for longitudinal movement over the area to be poured,

a concrete finisher independently mounted on said equipment support rails for longitudinal movement over the area to be poured subsequent to said distributor,

a rolling pipe rail located along and supported by the overhang support brackets located on one side of the slab area to be poured, said rolling pipe rail extending longitudinally onto the approach area,

a rolling pipe mounted on said rolling pipe rail connected at its output end to said hopper of said distributor,

a concrete pump located on the approach area to the area to be poured,

a motor driven tractor located on the approach area to the area to be poured supporting said rolling pipe and rolling said rolling pipe along said rolling pipe rail, and

a flexible hose connecting the input end of said rolling pipe

with said concrete pump, said hose being laid in a serpentine configuration on the approach area prior to the pour of concrete into the area to be poured,

wherein concrete slurry flows from said pump, through said hose and rolling pipe to said distributor hopper to be distributed into the area to be poured, said distributor, finisher and rolling pipe coordinately moving foward longitudinally to pour and finish the area to be poured.

4,706,318

JOINT COVERING FOR EXPANSION JOINTS IN CARRIAGEWAYS, ESPECIALLY BRIDGES

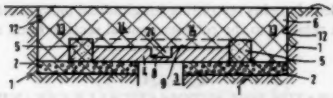
Reinhold Huber, Winzerweg 21, CH-8180 Bulach, Switzerland, and Waldemar Koster, Im Tentefeld 17, D-5062 Forsbach, Fed. Rep. of Germany

Filed Jan. 23, 1985, Ser. No. 693,852

Claims priority, application European Pat. Off., Jan. 23, 1984, 84100680.2

Int. Cl.[4] E01D *19/06*

U.S. Cl. 14—16.5 **9 Claims**



9. Apparatus for providing a cover for an expansion joint, which comprises

means, having a recess therein, for bridging the joint; and

elastomeric means providing a locking projection into said recess, covering and holding the bridging means centrally with respect to the joint without impairing its elastic behavior.

4,706,319

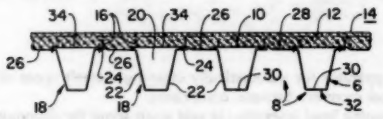
LIGHTWEIGHT BRIDGE STRUCTURE

Eugene W. Sivachenko, 6471 Riverside Dr., Redding, Calif. 96001, and Firoze H. Broacha, Lakewood, Colo., assignors to Eugene W. Sivachenko, Redding, Calif.

Filed Sep. 5, 1978, Ser. No. 939,925

Int. Cl.[4] E01D *19/12*

U.S. Cl. 14—73 **19 Claims**



2. A bridge longitudinally suspended between spaced apart abutments for carrying traffic and comprising as the sole load carrying members between the abutments: a corrugated plate including a plurality of side-by-side corrugations extending longitudinally between the abutments and having a generally trapezoidal cross-section, the corrugations being defined by alternating corrugation peaks and corrugation troughs each of which includes a generally flat, relatively narrow peak section, a correspondingly shaped and oriented trough section, and corrugation sides interconnecting proximate peak and trough sections, the peak sections, the trough sections and the corrugation sides being substantially parallel to the length of the corrugated plate; plate means rigidly secured to the corrugated plate and including a layer of concrete defining a traffic carrying surface of the bridge and a flat plate disposed substantially parallel and spaced apart from the surface, the concrete layer and the flat plate means being rigidly interconnected and having a sufficient rigidity so that the plate means distributes a point load applied to the traffic carrying surface in a lateral direction over a plurality of corrugations.

4,706,320

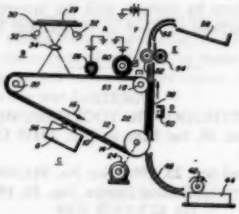
ELECTROSTATIC CHARGING AND CLEANING BRUSHES

Joseph A. Swift, Ontario, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 4, 1985, Ser. No. 804,563

Int. Cl.[4] G03G *21/00*; A46B *9/02*

U.S. Cl. 15—1.5 R **17 Claims**



1. A cylindrical fiber brush comprising an elongated cylindrical core having bound thereto a spirally wound conductive pile fabric strip forming a spiral seam between adjacent windings of said fabric strip, the fiber density of said fabric strip at the strip edges being at least double the fiber fill density in the center portion of the fabric strip.

14. An apparatus for cleaning an electrostatographic imaging member of residual toner comprising an elongated cylindrical core having bound thereto a spirally wound conductive pile fabric strip having a spiral seam between adjacent windings of said fabric strip, the fiber fill density of said fabric strip at the strip edges being at least double the fiber fill density in the center portion of the fabric strip;

means for electrically biasing said brush to a polarity opposite to that of the charge on said toner and means to provide rotational contact of said brush fiber with said imaging member whereby said toner is attracted to said brush when said brush contacts said imaging member.

4,706,321

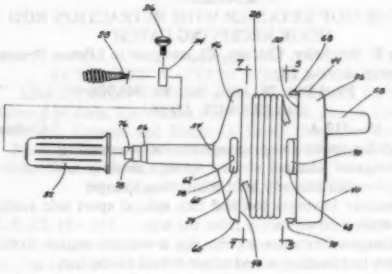
DRAIN-CLEANING IMPLEMENT

Paul S. Kaye, Racine, Wis., assignor to Lewisan Products, Inc., Racine, Wis.

Filed Oct. 6, 1986, Ser. No. 915,625

Int. Cl.[4] B08B *9/02*

U.S. Cl. 15—104.3 SN **18 Claims**



1. In a drain-cleaning implement of the type having a snake-containing plastic shell made from two plastic subshells

snapped together along a pair of abutting annular edges around a cylindrical shell sidewall, the improvement comprising:

one subshell having female mating mean along the abutting edges;

the other subshell having on its inside surface inwardly-projecting sidewall portions formed at intervals around such surface and extending beyond the abutting edges as projections with outwardly-facing male mating means thereon positioned to engage the female mating means;

the inside surface having substantially edge-free transitions between the inwardly-projecting sidewall portions and positions therebetween; and

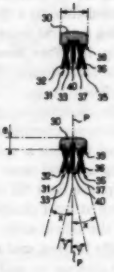
the snake being coiled within the shell and exerting radially-outward force by contact with the inwardly-projecting sidewall portions to assist in engagement of the mating means.

4,706,322

ORTHODONTIC TOOTHBRUSH

Yvon M. Nicolas, 38, rue Penn ar Roz, 29119 Chateaunef-du-Faou, France

Filed Sep. 23, 1986, Ser. No. 911,049
Claims priority, application France, Sep. 23, 1985, 85 14161
Int. Cl.[4] A46B *9/04*
U.S. Cl. 15—106 **10 Claims**



1. Orthodontic toothbrush, particularly for children wearing regulating pins, characterized by a brushing head (30) comprising on the one hand two lateral and longitudinal groups of tufts of bristles (31,35), each group possessing tufts (32,36) inclined towards the outside of the brushing head and diverging relative to a median longitudinal plane (P) of the head, and tufts (33,37) converging towards this median longitudinal plane (P), and secondly at least one central longitudinal row of shorter tufts (40) parallel to the median longitudinal plane (P).

4,706,323

SPONGE MOP RETAINER WITH RETRACTION ROD HOOK RECEIVING CATCH

Douglas R. Batchelor, Chicago, Ill., assignor to Libman Broom Company, Arcola, Ill.

Filed Dec. 29, 1986, Ser. No. 946,906
Int. Cl.[4] A47L *13/144*
U.S. Cl. 15—119 A **7 Claims**

1. A roller sponge mop sponge retainer comprising:

an elongated channel shaped sponge retainer adapted to receive and securely hold a roll mop sponge;

the retainer having a top and two spaced apart side walls extending downwardly from the top;

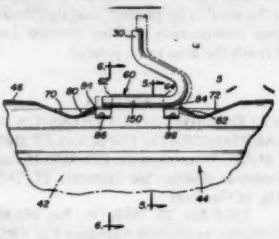
the elongated retainer top having a central section hook catch terminating in end edges lateral to the top;

the retainer top adjacent each end edge of the central section comprising a depressed portion having an end edge vertically lower than the adjacent central section end edge;

each pair of adjacent central section end, and depressed portion end, edges defining an opening into which an operating rod hook can be operatively inserted;

each depressed portion having a raised element;

the raised elements being spaced apart a distance slightly



greater than the length of the rod hook adapted to be longitudinally positioned beneath the central section hook catch; and

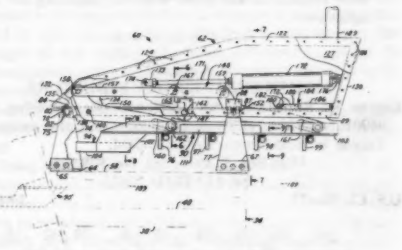
the raised elements restricting longitudinal movement of the hook relative to the retainer central section hook catch.

4,706,324

APPARATUS FOR AUTOMATICALLY CLEANING SMELT SPOUTS OF A CHEMICAL RECOVERY FURNACE

Byron L. Goodspeed, 1111 Holcomb Rd., Kelso, Wash. 98626

Filed Oct. 17, 1986, Ser. No. 919,969
Int. Cl.[4] D21C *11/00*
U.S. Cl. 15—246 **20 Claims**



1. Apparatus for automatically cleaning a smelt spout of a chemical recovery furnace, comprising:

a cleaning head insertable in said smelt spout for dislodging obstructions therein,

actuating means for inserting said cleaning head into said smelt spout and subsequently retracting said cleaning head from said smelt spout, and

means mountable adjacent to said smelt spout for housing said actuating means.

4,706,325

FILM CLEANER

Manfred G. Michelson, 4396 Park Vicente, Calabasas, Calif. 91311

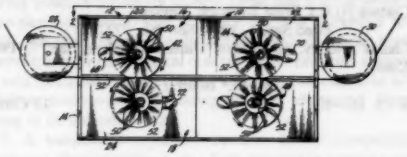
Filed Jul. 9, 1986, Ser. No. 883,618
Int. Cl.[4] B08B *11/02*; A46B *13/02*
U.S. Cl. 15—308 **18 Claims**

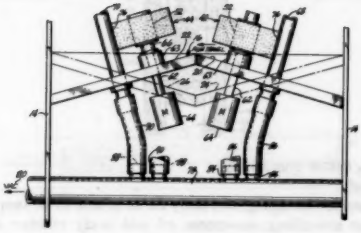
1. A film cleaner for cleaning an elongated traveling film strip, the film cleaner comprising:

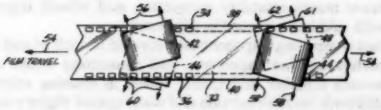
a pair of rotary brushes spaced apart axially along the direction of travel of the film strip;

means mounting the brushes for direct contact with the same

side of the film strip for brushing dirt particles away from the film, the brushes being mounted on an angle relative to the direction of film travel so that one brush contacts the film from only the central region of the film to one edge of the film and the other brush contacts the film from only the central region of the film to the other edge of the film; and







means for rotating the brushes so that each brush is rotated in a direction for brushing particles only from the central region of the film strip toward its opposite edges, thereby avoiding brushing of particles toward the central region of the film from a region along each edge of the film strip.

4,706,326

DUAL MODE HAIR VACUUM AND DRYER UNIT

R. Marlene Romani, Indiana, Pa., assignor to M.D.C. Romani, Inc., Indiana, Pa.

Filed Aug. 22, 1986, Ser. No. 899,566
Int. Cl.[4] A47L 5/36
U.S. Cl. 15—314 **18 Claims**

1. A dual mode hair vacuum and dryer unit, comprising:

(a) housing means having separate compartments;

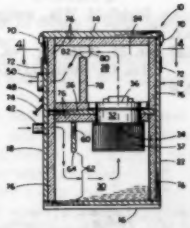
(b) airflow-creating means having a suction inlet and a pressure outlet and being mounted within said housing means with its suction inlet in communication with one of said compartments and its pressure outlet in communication with the other of said compartments for creating airflow from said one compartment to said other compartment;

(c) air inlet means on said housing means communicating with said one compartment;

(d) air outlet means on said housing means communicating with said other compartment;

(e) a vacuum attachment being adapted for connection to said air inlet means for communicating a vacuum airflow from outside of said housing means to said suction inlet of said airflow-creating means, via said air inlet means and said one compartment of said housing means, so as to entrain hair cuttings and other matter in said vacuum airflow;

(f) a dryer attachment being adapted for connection to said air outlet means for communicating said airflow-creating means to the outside of said housing means, via said other compartment and said air outlet means of said housing means, to dry wet hair; and



(g) means defined within said one compartment for collecting hair cuttings and other matter entrained in said vacuum airflow from outside of said housing means before reaching said suction inlet of said airflow-creating means;

(h) said collecting means being formed by an end of said one compartment of said housing means being spaced from said airflow-creating means and by a baffle member mounted in said one compartment spaced from said end thereof and extending across a direct path of airflow from said air inlet means to said suction inlet of said airflow-creating means so as to force said airflow to follow an indirect path from said air inlet means in a first direction toward said compartment end, around said baffle member and then toward said suction inlet of said airflow-creating means in a second direction generally opposite said first direction, whereby hair cuttings and other matter entrained in said airflow will collect within said one compartment at said end thereof.

4,706,327

AUTOMATIC VACUUM NOZZLE HEIGHT ADJUSTMENT SYSTEM FOR VACUUM CLEANER

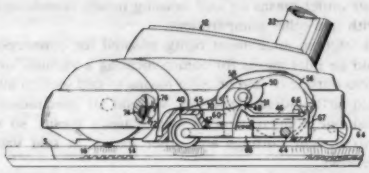
Edward H. Getz, Eau Claire; Kurt Werner, St. Joseph Township, Berrien County, and Roger D. Burdi, Royalton Township, Berrien County, all of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed May 30, 1986, Ser. No. 868,535
Int. Cl.[4] A47L 9/28
U.S. Cl. 15—319 **15 Claims**

1. A height adjustment apparatus for use in a vacuum cleaner having a brush mounted for rotation in proximity to a vacuum nozzle orifice and a motor for rotating said brush, comprising:

means for adjusting the height of said brush from a surface to vary the speed of the motor as a function of the load transmitted to the motor by the brush;

sensing means for sensing the brush speeds resulting from said height adjustments; and



means responsive to said speed sensing means for controlling said height adjusting means, including means for establishing a height that is a function of the sensed brush speed.

4,706,328

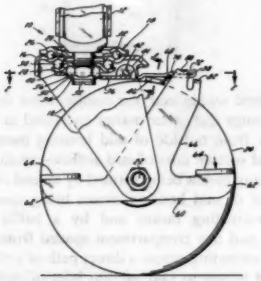
PIVOTED CASTER WHEEL AND YOKE BRAKE HAVING A DETENT

Jeffrey J. Broeske, Richfield, Wis., assignor to E. R. Wagner Mfg. Company, Hustisford, Wis.

Filed Apr. 25, 1986, Ser. No. 856,024

Int. Cl.[4] B60B *33/00*

U.S. Cl. 16—35 R **10 Claims**



1. A caster comprising:

a support member having a central longitudinal axis and adapted to support a load, said support member including a lower end portion, said lower end portion of said support member including a periphery having a plurality of substantially flat surfaces,

a yoke including a pair of generally parallel downwardly extending parallel arms,

a wheel housed between said generally parallel arms and supported for rotation by the generally parallel arms about a first axis,

means for rotatably joining said yoke to said support member for rotation about a second axis, and

means for selectively braking said wheel against rotation about said first axis and said yoke against rotation about said second axis, said means for braking including

a brake member supported by said yoke for pivotal movement between a disengaged position and a braking position, the brake member including opposite ends and being supported for pivotal movement intermediate said opposite ends,

one of said opposite ends of said brake member including an aperture, said one of said opposite ends of said brake member being movable between a disengaged position wherein said one of said opposite ends of said brake member is spaced from said lower end of said support member and a second position wherein said lower end portion of said support member is housed in said aperture, said aperture having a configuration for engaging said lower end of said support member such that said one of said opposite ends of said brake member prevents rotation of said support member with respect to said brake member said aperture defining a socket being complementary in shape to said lower end portion and being adapted to house said lower end portion of said support member when said brake member is moved to said braking position.

4,706,329

TWIN-WHEEL CASTOR

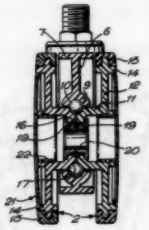
Stafford T. Screen, Stourbridge, England, assignor to Colson Castors (U.K.), West Bromich, England

Filed Sep. 6, 1985, Ser. No. 773,382

Claims priority, application United Kingdom, Sep. 7, 1984, 8422660

Int. Cl.[4] B60B *33/00*

U.S. Cl. 16—47 **13 Claims**



1. A castor comprising:

a body,

means for mounting said body on an article to be supported for swivelling movement of said body relative to the article about a substantially vertical axis.

a circular aperture in said body of which the edge is shaped to function as a ball race.

two wheels each having a hub portion, each of said hub portions comprising

an end wall, and an aperture formed in said end wall,

fastener means rotatably connecting said wheels together with said hub portions in adjacency,

means comprising a spacer bush received in each of said hub portion and wall apertures, and connecting means connecting together said spacer bushes in abutting relationship with said hub portion end walls spaced slightly apart,

formations at the adjacent ends of said hub portions, said formations cooperating to define a ball race opposed to said body ball race, and

bearing balls received between said ball races to rotatably mount said wheels to said body.

4,706,330

AUTOMATIC CLOSING ACTIVATOR

Ronald Sampson, 7/26-28 Kairawa Street, South Hurstville, New South Wales, 2221, Australia

Filed Feb. 19, 1986, Ser. No. 831,151

Claims priority, application Australia, Feb. 20, 1985, 53775/86

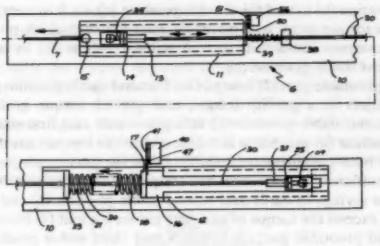
Int. Cl.[4] E05F *15/20*

U.S. Cl. 16—48.5 **7 Claims**

1. A temperature-operated traction device comprising an elongated element made from a heat-responsive memory material, said elongated element capable of deforming when in an unheated state in response to a force exerted by a load, and exerting a traction force by returning to its original shape when an electrical heating current is passed therethrough, electrical circuit means for automatically passing said electrical heating current for a predetermined time through said elongated ele-

ment after it has been deformed in its unheated state to retore it to its original non-deformed shape; two relatively movable slides, each movable along an associated slideway extending parallel to said elongated element, said slides adapted to move along said slideways to assume relative positions in response to a change in shape of said elongated element, a first one of said slides being adapted to be connected to the load to displace said load in the direction of tractoin when said elongated element is heated; a spring extending between an upstanding anglepiece affixed to the floor of a second one of said slideways and an end of said second slide adjacent said first slide, said spring yielding resiliently so as to allow said load to move in a direction opposite to that in which traction is exerted when said elongated element is heated by said electrical heating current; and a first electrical contact which prevents activation of said electrical heating current unless said second slide is at a relative position corresponding to said elongated element being in its unheated state.

7. A temperature-operated traction device comprising a T-shaped element made from a heat responsive memory material, said T-shaped element capable of deforming when in an unheated state in response to a force exerted by a load, and exerting a traction force by returning to its original shape when an electrical heating current is passed therethrough, electrical



circuit means for automatically passing said electrical heating current for a predetermined time through said T-shaped element after it has been deformed in its unheated state to restore it to its original non-deformed shape; a flexible tie having a first end adapted to connect to said load and a Y-shaped second end, the free ends of which are fixedly attached to the respective arms of the T-shaped element, whereby the arms of the T-shaped element are bent in the direction of force exerted by said load when said T-shaped element is in an unheated state, a socket element having a cavity for slidably housing the stem of the T-shaped element including a spring fixedly attached to a base of said cavity and the stem of the T-shaped element for allowing said load to move in a direction opposite to that in which traction is exerted when said T-shaped element is heated and oppositely positioned wings for operatively engaging said arms of said T-shaped member by attachment means, a first electrical contact to prevent activation of said electrical heating current unless said arms of said T-shaped member and said wings of said socket element are at relative positions corresponding to said T-shaped element being fully shrunk, and a second electrical contact to prevent activation of said electrical heating current unless said stem of said T-shaped member is at a position it occupies when said T-shaped member is in an unheated state.

4,706,331

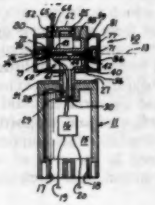
SECURITY HINGES AND JUNCTION BOXES FOR LAMP HOUSINGS

Wayne W. Compton, Chino Hills, Calif., assignor to Kidde Consumer Durables Corporation, City of Industry, Calif.

Filed Sep. 11, 1986, Ser. No. 906,423

Int. Cl.[4] E05D *11/00*

U.S. Cl. 16—223 **17 Claims**



1. A security hinge to mount a lamp housing to a support, said hinge comprising:

a first knuckle and a second knuckle joined together for relative rotation with respect to each other around a hinge axis;

said first knuckle having a first side and a second side through which said axis passes, an internally threaded axially-extending socket opening into each side, and including rotation-resisting means on said first side;

said second knuckle comprising a first part and a second part, said parts each including interlinking means for binding said parts for simultaneous rotation around said axis, said first part facing said first side and bearing complementary rotation-resisting means engagable with those on the first knuckle to restrain the knuckle against relative rotation when engaged to one another, said second part facing said second side, both of said parts having an axial hole therethrough;

a pair of shroud members each having an abutment face, a side face with an axial aperture extending between them, there being a counterbore extending into said aperture and an internal shoulder, one of said shrouded members being disposed on each side of said second knuckle; and

a pair of hinge pins, each having an externally threaded shank and an enlarged head, and a shoulder on the head adjacent to the shank, said head having torque tool engagement means, and being so proportioned as to fit within said counterbore with the shoulders in abutment, the shank passing through the respective shroud member, second knuckle part, and into said socket, with the rotation-resisting means interengaged, and with the hinge tigthened together to hold it assembled and with a selected angularly adjusted relationship between the knuckles, said shroud members shielding said heads from direct lateral engagement by a torque tool.

4,706,332

CABINET HINGE

Karl Lautenschläger, Jr., Reinheim, Fed. Rep. of Germany, assignor to Karl Lautenschläger GmbH & Co. KG, Reinheim, Fed. Rep. of Germany

Filed Oct. 10, 1986, Ser. No. 917,413

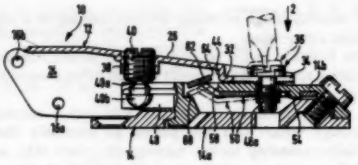
Claims priority, application Fed. Rep. of Germany, Oct. 14, 1985, 3536568

Int. Cl.[4] E05D *7/04, 7/06*

U.S. Cl. 16—241 **6 Claims**

1. A cabinet hinge having a supporting-wall-related part in the form of an elongated supporting arm of substantially channel-shaped cross section and having means for pivotal connection to a door-related part; a mounting plate having a bottom surface for placement on and fastening to a supporting wall of

a cabinet, a top surface essentially parallel to the supporting wall when mounted thereto, and also having at least one side surface essentially perpendicular to said top surface; said supporting arm being held releasably and adjustably in at least two coordinate directions on said mounting plate, said supporting arm having supporting-arm side walls at least partially straddling said mounting plate and also having a web joining said supporting-arm side walls, said web having a slot which is provided with an access opening at a transition area remote from said pivotal connection means; a mounting screw having a head, and a shank which is driven into said mounting plate and is adapted to pass from said access opening and through said slot; said supporting arm also being provided at a distance from said slot in said web with a tap through which may pass a headless screw for bearing against said mounting plate; a first abutment opposite said top surface of said mounting plate and facing an interior surface of said supporting arm and toward the pivotal connection means of said supporting arm; a resilient catch element disposed in the area of said mounting plate opposite said first abutment, said catch element having a second abutment pointing in a direction away from said pivotal connection means, said abutments being in such positions that upon a longitudinal displacement of said supporting arm on said mounting plate parallel to said top surface, said abutments will come into locking engagement with one another when said shank of said mounting screw driven into said mounting plate arrives in said transition area from said slot to said access opening, said resilient catch element being an elongated leaf spring arranged in the interior of said mounting plate and having a first end away from said pivotal connection means, said first end being connected to said mounting plate, said leaf spring extending from said first end towards said pivotal connection means, said leaf spring having a second end opposite said first end, said second end having a bend extending through a recess in said mounting plate towards said supporting arm, said bend forming said second abutment. said leaf spring having a threaded bore below said access opening, said access opening being wider than said shank, said shank passing freely through said access opening and being threaded into said threaded bore.



4,706,333

GAS SPRINGS WITH DIFFERENT ACTIVE LENGTHS TO PROVIDE PLURAL STABLE STOPPING POSITIONS

Leo Lauderbach, Steinbach, Fed. Rep. of Germany, assignor to Stabilus GmbH, Fed. Rep. of Germany

Filed Mar. 3, 1986, Ser. No. 835,268

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1985, 3509315

Int. Cl.[4] E05F *1/10*

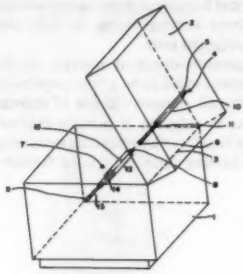
U.S. Cl. 16—289 **10 Claims**

1. A mechanical structure comprising a basic unit (1) and a pivotable part (2) mounted on said basic unit (1) for pivotable movement about a substantially horizontal axis (3) from a first stable position (a) through a second stable position (b) to a third stable position (c),

gas spring units (4, 7) being hingedly connected to both said basic unit (1) and said pivotable part (2) about hinge axes (5, 6, 8, 9) substantially parallel to said horizontal axis (3),

a first one (4) of said gas spring units (4, 7) having an active stroke corresponding to pivot movement of said pivotable part (2) from said first stable position (a) to said third stable position (c) and exerting a torque onto said pivotable part (2) during said active stroke, said torque biasing said pivotable part (2) towards said third stable position (c),

a second one (7) of said gas spring units (4, 7) having an active stroke corresponding to the pivot movement of said pivotable part (2) from said first stable position (a) to said second stable position (b), such as to exert a torque onto said pivotable part (2) during its movement from said first stable position (a) to said second stable position (b), said torque biasing said pivotable part (2) towards said second stable position (b), said second gas spring unit (7) further having a dead stroke corresponding to the pivot movement of said pivotable part (2) from said second stable position (b) to said third stable position (c), such as to exert no torque onto said pivotable part (2) during its pivot movement from said second stable position (b) to said third stable position (c),



said pivotable part (2) being in said second stable position (b) subject to a gravity torque, said gravity torque in said second stable position (b) acting towards said first stable position (a) and being in balance with the torques exerted by both gas spring units (4, 7) in that the gravity torque is insufficient to overcome the torques exerted by said two gas springs towards said second stable position (b) and as to exceed the torque of said first gas spring unit (4) biasing said pivotable part (2) towards said third stable position (c).

4,706,334

COMPARTMENT LID TORQUE ROD OPENER ASSIST ASSEMBLY

John R. Beckwith, Rochester, Mich., assignor to General Motors Corporation, Detroit, Mich.

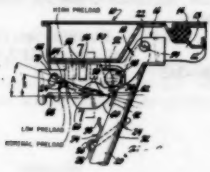
Filed Oct. 23, 1986, Ser. No. 922,248

Int. Cl.[4] E05F *1/08*

U.S. Cl. 16—308 **3 Claims**

1. A compartment having an opening, a lid for covering said opening, a pair of hinges pivotally connecting said lid to said compartment so as to move between open and closed positions opening and closing said opening, each said hinge having a strap connected to said compartment and a strap connected to said lid, a torque rod having a straight portion terminating with a reverse bent portion at each end thereof, one reverse bent portion of said rod forming a working end that hooks about one of said hinge lid straps to prevent twisting of the rod relative to said one lid hinge strap, permanent rod holding means for holding the working end of said rod at a permanent location on said one lid hinge strap, the other reverse bent portion of said rod forming an adjusting end that extends adjacent but not about the other lid hinge strap, releasable rod holding means on said lid for releasably holding the adjusting end of said rod at a place on the reverse bent portion thereof and also at a place on the intermediate portion thereof, rod retaining means pivotally connected to said compartment for

free swinging movement in the path of the adjusting end of said rod, rod retainer holding means on said compartment arranged in the swinging path of and operable to receive and hold said rod retaining means, said rod retaining means having a cam portion and two notches arranged so that the cam portion is engaged by the reverse bent portion of the adjusting end of the rod on first ever movement of said lid toward said closed position whereby to effect pivotal movement of both rod retaining means in one direction to a position causing the reverse bent portion to enter one of the notches and permit said



rod retaining means to then swing freely in the opposite direction such that the other notch then receives the intermediate portion whereafter said notches upon pivotal movement of said lid in the reverse direction toward said open position then trap the adjusting end and pull same from said releasable rod holding means whereupon said rod then forces said rod retaining means again in said one direction but to a further extent so as to engage and be held by said rod retainer holding means to said compartment whereby said rod is assembled to thereafter normally urge said lid to its open position.

4,706,335

HOG SPLITTER

Harlan L. Schram, Spring Lake, and Gerald L. O'Neil, Rockford, both of Mich., assignors to Wolverine World Wide, Inc., Rockford, Mich.

Filed Oct. 3, 1986, Ser. No. 915,729

Int. Cl.[4] A22B *5/20*

U.S. Cl. 17—23 **3 Claims**

1. A carcass back splitting machine comprising:

a carcass back splitting saw movable vertically through a splitting motion;

a multifaceted carcass supporting carrousel including a plurality of facets, each having carcass receiving and retention means for receiving and retaining a carcass to be advanced by said carrousel;

said carrousel being rotatable through successive stations including a carcass entry station, a carcass splitting station and a carcass discharge station;

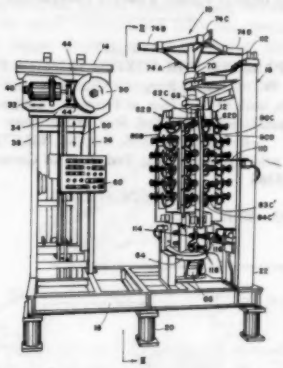
said carcass splitting saw being aligned with said carcass splitting station and advanceable to split the backbone of a carcass thereat;

said carcass receiving and retention means at each said facet including two lateral sets of suction means for respectively engaging the two side portions of a carcass and retaining the engagement from said carcass entry station through said carcass splitting station to said carcass discharge station;

each set of suction means comprising a series of suction cups, a vacuum source means operably connected to said suction cups for applying vacuum suction thereto;

a series of retractors supporting said suction cups and operable to retract said suction cups and a carcass engaged thereby; and

control means responsive with rotation of said carrousel for actuating vacuum suction to said suction cups at said entry



station and causing them to retract, for retaining said suction and retention at said splitting station, and for deactuating said vacuum suction and retraction at said discharge station.

4,706,336

APPARATUS FOR HANDLING FISH FILLETS FOR THE PURPOSE OF QUALITY INSPECTION

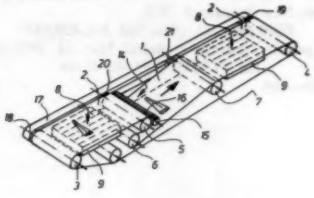
Franz Hartmann, Bad Oldesloe, and Klaus Matern, Lübeck, both of Fed. Rep. of Germany, assignors to Nordischer Maschinenbau Rud. Baader GmbH & Co. KG, Lubeck, Fed. Rep. of Germany

Filed Jul. 2, 1986, Ser. No. 881,119

Claims priority, application Fed. Rep. of Germany, Jul. 12, 1985, 3524906

Int. Cl.[4] A22C *25/00*

U.S. Cl. 17—55 **20 Claims**



1. An apparatus for handling fillets of fish for the purpose of detecting fillet deficiencies in the form of at least one of processing faults and parasites (nematodes) by visual inspection, said apparatus comprising;

a conveyor belt;

means for driving said conveyor belt to rotate endlessly in a predetermined direction about axes defined by at least first and second deflection roller means;

said conveyor belt including a fillet supporting surface;

said fillet supporting surface being light transparent and having a low light absorption;

at least one light source below said fillet supporting surface;

a screen below said fillet supporting surface;

said screen including means to permit said at least one light

source to illuminate an underside of said fillet supporting surface and to prevent direct passage of light therefrom to a position alongside said fillet supporting surface, such that looking at said apparatus from a position alongside said conveyor belt leaves said at least one light source concealed from direct sight, whereby said fillets appear as bright objects against a darker background.

4,706,337

APPARATUS FOR MIXING TEXTILE FIBERS

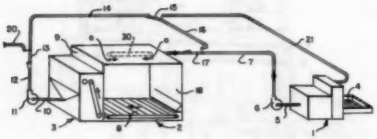
Friedrich W. Morgner, Bergisch Gladbach, and Franz Hock, Overath, both of Fed. Rep. of Germany, assignors to Temafa Textilmaschinenfabrik, Fed. Rep. of Germany

Filed Apr. 24, 1986, Ser. No. 856,072

Claims priority, application Fed. Rep. of Germany, Apr. 27, 1985, 3515368

Int. Cl.[4] D01G *13/00*

U.S. Cl. 19—80 R **3 Claims**



1. Apparatus for mixing fibers, comprising:

fiber spreader means capable of receiving fibers in bale form;

a mixing chamber having an end wall and a floor;

moveable means for travelling across said chamber and for charging said chamber with layers of fibers;

fiber conveying means located proximate to said chamber floor for conveying the fibers toward said end wall;

mixing means located proximate to said end wall for mixing the fibers;

output means responsive to said mixing means for outputting said mixed fibers; and

means for selectively connecting said output means to one of said charging means and said fiber spreader means for selectively recharging said chamber with said mixed fibers.

4,706,338

APPARATUS FOR FORMING FIBRE WEBS

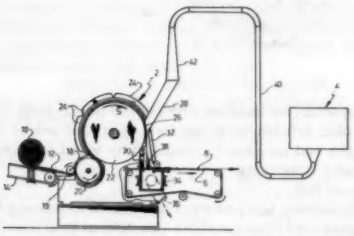
Jean M. H. Anspach, Sao José dos Campos, Brazil, assignor to Chicopee, New Brunswick, N.J.

Filed Mar. 12, 1986, Ser. No. 839,019

Claims priority, application Brazil, Mar. 12, 1985, 8501093

Int. Cl.[4] D01G *15/40, 15/46*

U.S. Cl. 19—105 **4 Claims**



1. Apparatus for forming fibre webs including first and second fibrous components in the form of at least two textile fibres differentiated by their average fibre length or a textile fibre and wood pulp, comprising a card means for individualizing said first fibrous component, said card means having a rotating cylinder for delivering individualized fibres of said first fibrous component to a discharge zone adjacent to the periphery of said rotating cylinder; air flow means for directing a flow of air to the peripheral surface of the rotating cylinder at the discharge zone and in a direction concurrent with the direction of rotation of the cylinder at the discharge zone, to discharge said first fibrous component into said air flow in the discharge zone; means separate and apart from said card means for individualizing said second fibrous component; duct means for transporting individualized fibres of said second fibrous component, said duct means having an outlet adjacent the periphery of said rotating cylinder to feed individualized fibres of said second fibrous component to said discharge zone; and means adjacent to said discharge zone and in the path of said air flow means for condensing the fibres mixed in said discharge zone whereby a highly uniform fibre web is produced including individualized fibres from said first and second fibrous components.

4,706,339

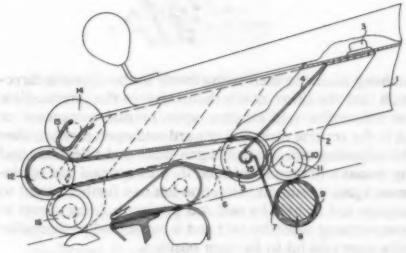
CLEANING TAPE FOR TOP ROLL ASSEMBLY

Kurt T. Eder, Alexanderstrasse 52, 7000 Stuttgart 1, Fed. Rep. of Germany

Filed Sep. 10, 1986, Ser. No. 905,923

Int. Cl.[4] D01H *5/60*

U.S. Cl. 19—265 **4 Claims**



1. In a weighting arm for drafting systems of spinning machines having a built-in cleaning device with driven cleaning tapes where

the tape guide rollers are fitted in an incorporated mounting support,

the movement for the cleaning tapes is taken up from the top roller,

the improvement, comprising:

the mounting support is incorporated in the weighting arm

the mounting support is a spring (**4**)

the drive of the cleaning tapes (**6**) is taken up by contact pressure of tape guide roller (**5**) with its cleaning tape (**6**) to back top roller (**11**) through spring (**4**).

4,706,340

METHOD AND AN ARRANGEMENT FOR PRODUCING A FIBRE LAYER

Ove Ahlstrand, Älvsjö, Sweden, assignor to Mo och Domsjo AB, Sweden

Filed May 29, 1986, Ser. No. 868,376

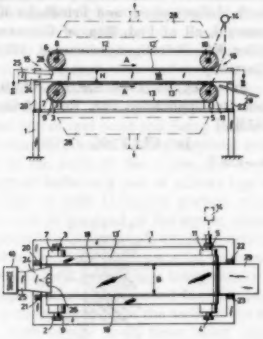
Claims priority, application Sweden, Jul. 2, 1985, 8503292

Int. Cl.[4] B01D *9/00;* **C01F** *5/34*

U.S. Cl. 19—296 **7 Claims**

1. A method for producing a uniform fibre layer, comprising the steps of defining a forming space between two air-permeable conveyor belts arranged for movement in mutually the same direction, introducing a fibre-air suspension into the forming space, and maintaining between the forming space and the ambient surroundings a pressure difference such as to cause the deposit of fibres on mutually facing surfaces of the con-

veyor belts, said defining step including the steps of arranging mutually facing belt sections (12',13') of the conveyor belts parallel with one another and arranging between said surfaces substantially sealing side-walls (18,19); said maintaining step



including the step of blowing the fibre-air suspension into the forming space at a pressure sufficient to create within said forming space a pressure which exceeds the pressure of the ambient surroundings.

4,706,341

WRITING INSTRUMENT CAP AND CLIP THEREFOR

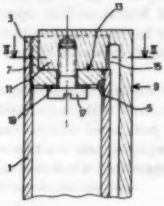
Jean E. Celaries, Faverges, France, assignor to S. T. Dupont, Paris, France

Continuation of Ser. No. 241,312, Mar. 6, 1981, abandoned. This application Sep. 16, 1982, Ser. No. 418,882

Claims priority, application France, Mar. 12, 1980, 80 05525

Int. Cl.[4] B43K *9/00, 25/00*

U.S. Cl. 24—11 R **9 Claims**



1. A cap for a writing instrument comprising:

a generally cylindrical tubular body having an internally threaded opening at a top end, and a slot in said top end;

a removable end piece screw threaded in said opening, said end piece including a cavity;

a removable clip releasably secured in said cavity and in said slot to said end piece, whereby rotation, and thereby translation, of said end piece with respect to said tubular body is substantially prevented; and

screw means accessable from inside said tubular body for releasably securing said clip with respect to said end piece.

4,706,342

PAPER CLIP

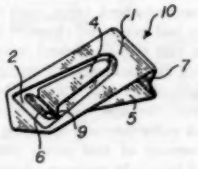
Wen C. Yu, 10318 Burgoyne, Houston, Tex. 77042

Filed Jun. 5, 1987, Ser. No. 58,375

Int. Cl.[4] B42F *1/02*

U.S. Cl. 24—67.9 **3 Claims**

1. A paper clip of resilient material comprising: a top member formed to provide an opening, a bottom member having a lower portion and a tilted upper portion integrally connected by a joint portion at their front ends forming an acute angle therein, the upper portion being shorter than the lower portion and the lower portion being shorter than the top member, and a curved web portion integrally connected the top and bottom members at their rear ends, the opening of the top member and the upper portion of the bottom member being formed to have substantially the same configuration with the opening being proportionally larger than the upper portion of the bottom member, the upper portion of the bottom member being resiliently bendable toward its lower portion and the top and bot-



tom members being resiliently separable to receive and hold the papers between substantially the entire bodies of the top member and the upper portion of the bottom member, the curved web portion and the joint portion being formed in such a manner to firstly permit the upper portion of the bottom member to be confined within the opening of the top member and located in substantially the same plane as is the top member whenever the clip is not being used, and secondly, enable the top member and the upper portion of the bottom member to receive a multiplicity of thickness ranges of papers and firmly and releasably hold them therein by maintaining a substantially parallel to each other relationship.

4,706,343

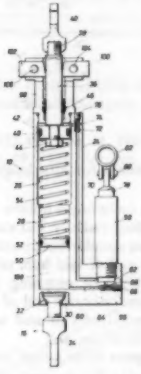
HYDRAULIC LOAD BINDER

Steven F. Neidigk, 1121 John Regan, Fort Worth, Tex. 76126

Filed Dec. 19, 1985, Ser. No. 810,739

Int. Cl.[4] A43C *11/00*

U.S. Cl. 24—68 R **14 Claims**



1. Load binding apparatus for tightening a binder between a first point on a load and a second point on a structure on which the load rests and to which the load is tied, comprising

a cylinder housing having an external connecting end for attaching to the first point, said cylinder housing having an operating chamber and a reservoir chamber,

a piston rod having a piston assembly operating in said

operating chamber having an external connecting end for attaching to the second point, said piston assembly including

a reservoir piston adjacent said reservoir chamber,

an operating piston adjacent said operating chamber, and a biasing spring therebetween,

a pump having a pump cylinder and a pump piston operating therein,

a first fluid channel communicating said reservoir chamber with said pump cylinder chamber, said first fluid channel including a first check valve,

a second fluid channel communicating said reservoir chamber with said operating chamber, said second fluid channel including a second check valve, such that fluid is withdrawn from said reservoir chamber through said first channel and past said first check valve into said pump chamber with the movement of said pump piston away from said first check valve and is delivered from said pump chamber through said second channel past said second check valve into said operating chamber with the reverse movement of said pump piston to pumpingly transfer fluid from said reservoir chamber to said operating chamber to thereby lower the piston rod in the operating chamber to tightenly bind the load, the reverse movement of the pump piston also shutting said first check valve,

said biasing spring allowing axial movement of said operating piston with respect to said reservoir piston.

4,706,344

BUTTON ASSEMBLY

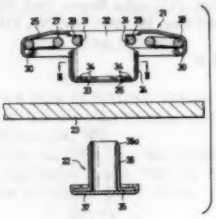
Akira Tanaka, and Hirokazu Watanabe, both of Kurobe, Japan, assignors to Yoshida Kogyo K. K., Tokyo, Japan

Filed Oct. 22, 1986, Ser. No. 921,528

Claims priority, application Japan, Oct. 22, 1985, 60-161764

Int. Cl.[4] A44B *1/42*

U.S. Cl. 24—94 **10 Claims**



1. A button assembly for attachment to a garment fabric, comprising:

(a) a button body including a hollow cylindrical hub, a head portion extending radially outwardly from one end of said hub, and an annular base portion extending inwardly from the other end of said hub, said annular base portion having a plurality of retaining ribs projecting axially therefrom toward said one end of said hub and extending around the central axis of said annular base portion at equal angular intervals; and

(b) an eyelet adapted to be joined with said button body to attach the latter to the garment fabric, said eyelet including a base and a hollow cylindrical shank extending substantially perpendicularly from said base for piercing through the garment fabric and then being inserted into the interior of said button body, said shank having a distal end portion plastically deformable into an annular curled edge abutting against top ends of the respective retaining ribs when said eyelet is axially compressed to join with said button body.

4,706,345

CLAMPING DEVICE FOR A TRACTION MEMBER, PARTICULARLY FOR A ROPE, CABLE BELT, CORD OR THE LIKE

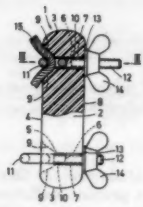
Gottfried Rockenfeller, Hilchenbach; Wolfgang Rockenfeller, Hilchenbach-Helberhausen, and Friedheim Kunze, Hilchenbach-Vormwald, all of Fed. Rep. of Germany, assignors to Rockenfeller XG Befestigungselemente, Hilchenbach, Fed. Rep. of Germany

Filed Sep. 25, 1986, Ser. No. 911,963

Claims priority, application Fed. Rep. of Germany, Oct. 1, 1985, 8527925[U]

Int. Cl.[4] F16G *11/06*

U.S. Cl. 24—135 L **10 Claims**



1. A clamping device for a traction member comprising:

an oblong body composed of plastic material;

a plurality of transverse slots formed in one longitudinal lateral surface of said oblong body;

a plurality of passages formed in said oblong body, each of said passages being connected to one of said transverse slots at one end thereof and to the longitudinal lateral surface opposing said longitudinal lateral surface having said slots therein at the other end;

two eye bolts with eyelets respectively guided in said transverse slots of said oblong body, shafts of each of said eye bolts projecting through the respective passages out from a longitudinal lateral surface opposing the longitudinal lateral surface having said slots therein;

a wing nut engaged with each of said hook-, eye-, or eyelet bolts; and

a plurality of lateral depressions in said oblong body each of which is associated with one of said transverse slots, and orthogonally positioned thereto each of said eyelets receiving and engaging said traction member which rests in said lateral depressions when said wing nuts are tightened.

4,706,346

CLAMPING COLLAR

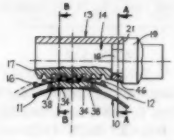
Jaime M. Verges, Sabadell, Spain, assignor to Mikalor, S.A., Sabadell, Spain

Filed Aug. 7, 1985, Ser. No. 763,343

Claims priority, application Spain, Aug. 9, 1984, 281,033

Int. Cl.[4] B65D *63/00*

U.S. Cl. 24—274 R **5 Claims**



1. In a clamping collar of the type comprising a hooped band

having one end and an opposite end, a rotatable screw having a threaded portion and a head and a neck interposed between said head and threaded portion, a support for said rotatable screw, said support being fixed on said one end of said band, said rotatable screw meshing with teeth formed in said opposite end of said band, said support including a portion having a U-shaped cross section straddling said screw, said support having a pair of first lugs extending from opposite sides of said U-shaped portion toward each other and cooperating with said U-shaped portion to substantially surround the threaded portion of said screw and said one end of the band, said first lugs engaging said one end of said band and fixing said band to said support, said U-shaped portion having opposed areas which are fitted close to the neck of the screw, the improvement wherein said support includes a pair of second lugs extending from opposite sides of said U-shaped portion toward each other and fitted close to the neck of the screw, opposite sides of said neck respectively facing said U-shaped portion and said second lugs, said second lugs blocking axial movement of the screw head therepast, said second lugs being axially separated from said first lugs, wherein said second lugs are bent toward said neck along a curve away from the teeth of the band so as to prevent the teeth of the band from being damaged by contact with said second lugs upon application of a tightening torque to the screw.

4,706,347

HANGER AND CLIP THEREFOR

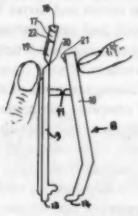
Brendan J. Lindsay, 9 Newhaven Street, Ellerslie, New Zealand

Filed Jul. 11, 1986, Ser. No. 884,515

Claims priority, application New Zealand, Jul. 15, 1985, 212736

Int. Cl.[4] A44B *21/00*

U.S. Cl. 24—517 **12 Claims**



1. A combination hanger and clip for hanging garments and other articles therefrom, comprising:

(a) an elongated hanger bar;

(b) support means associated with said bar for permitting the hanging of said bar from a support member;

(c) at least one clip provided on said bar, said clip being of an integral one-piece construction and comprising a pair of gripping arms pivotally movable relative to each other, said gripping arms being respectively formed with lower, free end portions movable between a first, open position in which the ends are spaced, and a second, closed position in which the ends are adjacently positioned for securing a garment therebetween, a pivotal connection between said gripping arms comprised of a connecting arm integrally formed with said arms and extending between respective inner surfaces of said gripping arms, said connecting arm having a portion of lesser thickness intermediate its length about which said gripping arms can pivot; and

(d) locking means for locking said free ends of said gripping arms in said second position for securely gripping the garment placed between said free ends, said locking means comprising first and second parts intergrally formed at respective upper end portions of said gripping arms, said parts being releasable to permit said free ends to be moved to said first position in which said garment can be released.

4,706,348

TENSIONING CHAIN PROVIDED WITH GRIPPERS

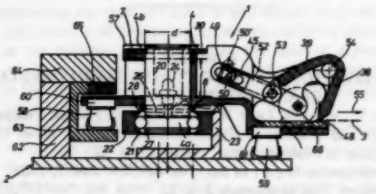
Harry Gresens, Benningen, Fed. Rep. of Germany, assignor to Bruckner Trockentechnik GmbH & Co. KG, Leonberg, Fed. Rep. of Germany

Filed Mar. 18, 1986, Ser. No. 840,005

Claims priority, application Fed. Rep. of Germany, Apr. 4, 1985, 3512417

Int. Cl.[4] D06C *3/04*

U.S. Cl. 26—93 **1 Claim**



1. A tensioning chain consisting of a plurality of grippers which are flexibly connected to one another by means of link pins and fishplates, each gripper containing a gripper body having two arms on which a gripper flap is pivotally mounted and is movable between an open position and a closed position, the gripper body also containing a gripper table, the gripper flap being constructed as an angle lever having two arms, one of which forms a gripper blade, characterized in that the gripper body is made of a material of the class consisting of cast spheroidal graphite and high-grade cast steel, the arms of the gripper body extending upward from the gripper body at an angle whereby the point at which the gripper flap is pivoted is spaced above the gripper table, the angle between the two arms of the gripper flap being small enough so that the other arm of the gripper flap does not project above the gripper body in the open position, the ratio of the length to the diameter of each link pin being between 1:0.9 and 1:1.5, a bearing pin on the other arm of the gripper flap being pivoted to a housing which has a slot which receives a bearing pin on the gripper body, and a spring in said housing which acts upon the two bearing pins to hold the flap both in its open and in its closed position.

4,706,349

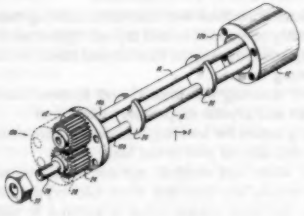
ADJUSTABLE CURVATURE ROLL

James O. Gallant, Dighton, Mass., assignor to SW Industries, Inc., Providence, R.I.

Continuation of Ser. No. 822,490, Jan. 21, 1986, abandoned. This application Dec. 29, 1986, Ser. No. 943,812

Int. Cl.[4] D06C *3/06*

U.S. Cl. 26—104 **25 Claims**



1. A stationary axle for an adjustable curvature roll comprising:

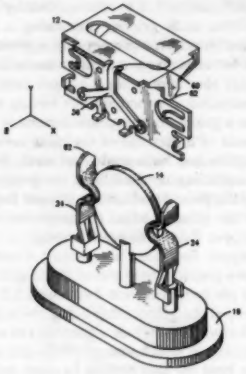
a longitudinally elongated, hollow, cylindrical body;
two longitudinally extending rods inserted within said hollow, cylindrical body, a first end of both of said rods being secured to an end plate at a first end of said body;
means attached to a second end of each rod and cooperating together to simultaneously apply a tensile axial force to either one of said two rods and a compressive axial force to the other rod; and
means connected to said force applying means for effecting simultaneous application of the axial forces to said rods.

4,706,350

SELF-LOCATING, SELF-FIXTURING HARD CRYSTAL BLANK MOUNTING SYSTEM

Charles W. Mooney, Lake Worth; Robert E. Phipps, Pompano Beach, and William J. Kuznicki, Coral Springs, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation-in-part of Ser. No. 689,639, Jan. 7, 1985, abandoned. This application Jun. 23, 1986, Ser. No. 877,035
Int. Cl.[4] H04R *17/00*
U.S. Cl. 29—25.35 **29 Claims**



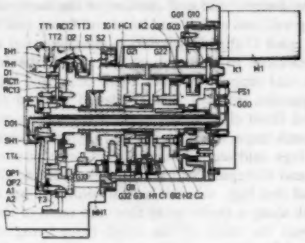
1. An apparatus providing self-locating and self-fixturing means for the assembly of a hard crystal blank onto the base, the base including a plurality of pins for electrical connection to the hard crystal blank, said apparatus comprising:
crystal supporting means for receiving and supporting the hard crystal blank;
vertical locating means for locating the hard crystal blank in the vertical or Y—Y direction;
horizontal locating means for locating the hard crystal blank in the horizontal or X—X direction;
transverse locating means for locating the hard crystal blank in the transverse or Z—Z direction,
said vertical, horizontal and transverse locating means being detachably connected to said crystal supporting means for locating and fixturing the hard crystal blank to said crystal supporting means;
means for securing the located and fixtured hard crystal blank to said crystal supporting means; and
connecting means for securing said crystal supporting means to the plurality of pins in the base;
whereby, when said vertical, horizontal and transverse locating means are detached from said crystal supporting means, the hard crystal blank is secured to said crystal supporting means and said crystal supporting means is further secured to the plurality of pins such that the hard crystal blank is precisely aligned to the base.

4,706,351

TWIN DISC TYPE TOOL TURRET MECHANISM FOR CNC MACHINES

Kuo-Huey Chuang, No. 10, Yuan-Tung Street, Lin 16, Pao-An Li, Chia-Yi City, Taiwan

Filed Mar. 7, 1986, Ser. No. 837,393
Int. Cl.[4] B23B *3/16*
U.S. Cl. 29—39 **6 Claims**



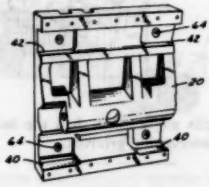
1. A twin disc type tool turret mechanism for CNC machines comprising:
turret housing means
front turret and a rear turret means mounted in said housing means, the two turrets being mounted so that they can be separately rotated for tool selection with said rear turret being axially fixed and said front turret being axially moveable;
three-piece toothed coupling means having first, second and third coupling elements connected respectively to said front turret, rear turret and turret housing means for interlocking said front and rear turrets against rotation, said coupling elements being constructed so as to be unlocked upon axial movement of said front turret away from said rear turret by disengagement of the teeth of one of said first or second coupling elements from the teeth of said third coupling element and the other of said first or second coupling elements to release said turrets for rotation;
a plurality of OD turning tools and a first workpiece measuring probe radially disposed on said front turret for outside cutting and measuring operations;
annular body means on said rear turret adapted to receive a plurality of devices from the group consisting of boring tools, a second workpiece measuring probe, rotary tools for milling and drilling, end lathe tools and OD turning tools, which are axially disposed on a periphery of said annular body means;
transmission means including a hydraulic cylinder device and a gearing system installed in said turret housing means and mechanically connected to both turrets for separately operating said turrets;
a hydraulic system provided in said turret housing means and functionally coupled with said transmission means and said turrets for respectively controlling the rotation of said turrets;
inter-disc contact means and inductive signal transmission means respectively installed in said front and rear turrets for automatically measuring outside and inside diameters of a workpiece in process; and
a cutting fluid supply system, including a passageway extending along the central axis of said turret housing means, for supplying cutting fluid to any tool in an active position during the operation of either turret;
whereby, both turrets can be separately operated without interference and tools can be operationally disposed in said turrets without increasing the turret size.

4,706,352

METHOD OF MAKING A SLIDE AND WAY ASSEMBLY

Robert A. Furmanek, Maple Heights; Jyoti P. Mukherjee, North Royalton, and Pasquale J. Lanese, Mayfield Heights, all of Ohio, assignors to The Warner & Swasey Company, Cleveland, Ohio

Division of Ser. No. 925,014, Oct. 30, 1986, Pat. No. 4,684,266.
This application Mar. 23, 1987, Ser. No. 29,126
Int. Cl.[4] B21D *53/10*
U.S. Cl. 29—149.5 R 3 Claims



1. A method of forming precise bearing surfaces (50) for bearing components (28–38) that support a slide (20) on ways (24, 26), the method comprising:

(a) rough machining pockets (40, 42) in said slide (20);

(b) positioning said slide (20) on said ways (24, 26) and aligning said slide relative thereto;

(c) inserting blocks (60) into spaces between said pockets (40, 42) and said ways (24, 26) to simulate the size and configuration of said bearing components and to substantially fill the spaces between said pockets (40, 42) and said ways (24, 26);

(d) pouring adhesive material into the remaining spaces between said blocks (60) and said pockets (40, 42) to form precise bearing surfaces (50) for said bearing components; and

(e) removing said blocks (60) and mounting bearing components (28, 30, 32, 36) in the spaces occupied by said blocks (60).

4,706,353

METHOD AND APPARATUS FOR THE ASSEMBLY OF ROTARY COMPRESSORS PARTICULARLY FOR MOTOR COMPRESSOR UNITS FOR REFRIGERATORS AND THE LIKE

Marek Zgliczynski, Turin, and Giancarlo Sesona, Venaria, both of Italy, assignors to Aspera S.r.l., Turin, Italy

Filed Oct. 29, 1986, Ser. No. 924,465
Claims priority, application Italy, Oct. 29, 1985, 67912 A/85
Int. Cl.[4] B23P *15/00, 21/00*
U.S. Cl. 29—156.4 R 8 Claims

1. Method for the assembly of a rotating ring rotary compressor, the compressor comprising:

a cylinder with a wall defining a compression chamber having a main central axis,

a rotary shaft having an eccentric core for orbiting within the compression chamber, the core having a region of maximum eccentricity relative to the shaft, the shaft being supported in its position of rotation by means of first and second supports with overall tubular structures disposed on opposite sides of the cylinder,

a roller fitted around the eccentric core of the shaft, and

fixing means acting between the cylinder and the first and second supports capable of being brought into a closed position to clamp the cylinder and the first and second supports in a final position of assembly, the method including the steps of:

bringing together the cylinder, the shaft, the roller and the first and second supports while keeping the fixing means away from the position of closure,

orienting the shaft relative to the cylinder, the region of maximum eccentricity of the eccentric core being brought into a reference plane passing through the said main central axis and having a predetermined angular position relative to the cylinder,

exerting a relative force between the rotary shaft on the one hand and the cylinder and the first and second supports on the other hand oriented in the said reference plane and in the direction corresponding to the bringing of the region of maximum eccentricity of the eccentric core of the shaft closer to the portion of the wall of the cylinder facing it until the shaft is brought into firm contact with the roller and the first and second supports and the roller are brought into firm contact with the cylinder,

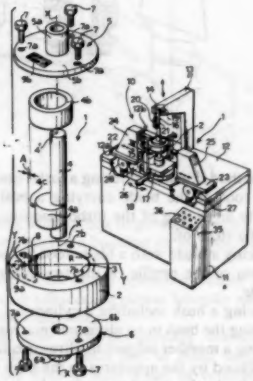
maintaining the shaft and the first and second supports in the said position of firm contact, causing a relative movement of the cylinder with respect to the shaft of a predetermined magnitude oriented in the said reference plane and in the direction opposite the direction of the said relative force, and

moving the said fixing means into the closed position.

3. Apparatus for assembling a rotating ring rotary compressor, the compressor comprising:

a cylinder with a wall defining a compression chamber having a main central axis,

a rotary shaft having an eccentric core for orbiting within



the compression chamber, the core having a region of maximum eccentricity relative to the shaft, the shaft being supported in its position of rotation by means of first and second supports with overall tubular structures disposed on opposite sides of the cylinder,

a roller fitted around the eccentric core of the shaft, and

fixing means acting between the cylinder and the first and second supports capable of being brought into a closed position to clamp the cylinder and the first and second supports in a final position of assembly, the apparatus comprising:

a framework having support means for holding the axis of the shaft stationary, the shaft having been assembled together with the cylinder, the roller and the first and second supports,

first thrust means mounted on the framework and able to act on the cylinder and on the first and second supports assembled with the shaft and with the roller in a reference plane passing through the said main central axis in a predetermined angular position relative to the cylinder,

stop means for keeping the shaft and the first and second supports in a temporary relative fixed position, and

second thrust means mounted on the framework and able to act on the cylinder in the said reference plane and in the opposite direction from the first thrust means.

4,706,354

METHOD OF MANUFACTURING A ROOT PIVOT ASSEMBLY OF A VARIABLE INCIDENCE TURBO-MACHINE BLADE

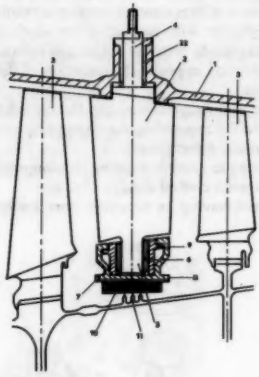
Jacky Naudet, Bondoufle, and Jacques M. P. Stenneler, Le Chatelet en Brie, both of France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation "S.N.E.C.M.A.", Paris, France

Filed May 29, 1986, Ser. No. 868,040

Claims priority, application France, May 29, 1985, 85 08015

Int. Cl.[4] B21K *3/04*; B23P *15/02*

U.S. Cl. 29—156.8 R **5 Claims**



1. A method of manufacturing a turbo-machine blade assembly, the root of the blade carrying a bush enabling turning within the inner ring of the turbo-machine, the method comprising the steps of:

producing a blade with a blade root in the form of a prolongation of the profile of the aerodynamic portion of the blade,

producing a bush including a cylindrical external seating,

mounting the bush in an ultrasonic machining apparatus, and

applying a member subject to ultrasonic frequency vibration produced by the apparatus to the bush to form a recess in said bush, the member having dimensions such that the recess is finish machined to a size matched to the blade root.

4,706,355

METHOD OF MAKING AN INTERNALLY GROOVED AND EXPANDED TUBULAR HEAT EXCHANGER APPARATUS

John P. Kuhns, Hurst, and James R. Taylor, Dallas, both of Tex., assignors to Q-Dot Corporation, Garland, Tex.

Division of Ser. No. 680,310, Dec. 11, 1984. This application Aug. 21, 1986, Ser. No. 898,414

Int. Cl.[4] B21D *53/02*

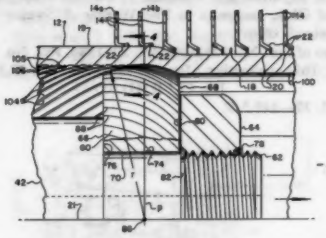
U.S. Cl. 29—157.3 C **1 Claim**

1. A method of manufacturing a heat exchanger apparatus comprising at least one elongated relatively thinwalled fluid conducting tube, comprising the steps of:

providing a tool comprising a convex curved tool member having a plurality of helical teeth formed on the peripheral curved surface of said tool member, said tool member being constructed for support on a mandrel for forcible traversal through at least a portion of said tube;

traversing said tool member through said tube in one direction while rotating said tool member relative to said tube to form a plurality of substantially continuous helical ridges and intervening grooves in the inner cylindrical wall of said tube; and

providing a second tool on said mandrel having a plurality of teeth formed thereon for forming grooves in said ridges



having a helix angle other than the helix angle of said ridges and intervening grooves.

4,706,356

PROCESS FOR COMPRESSING BY HAMMERING A STEAM GENERATOR TUBE SET

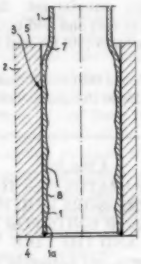
Claude Bianchi, Paris; Ives Fournier, Chatenoy Le Royal, and Paul Jacquier, Tassin La Demi-Lune, all of France, assignors to Framatome, Courbevoie, France

Filed Nov. 6, 1985, Ser. No. 795,594

Claims priority, application France, Nov. 9, 1984, 84 17130; Jul. 3, 1985, 85 10175

Int. Cl.[4] B21C *37/30*; B24B *39/00*

U.S. Cl. 29—157.4 **8 Claims**



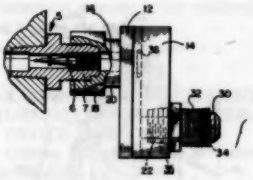
1. A process for compressing by hammering a tube of a steam generator of a nuclear reactor set in a tube plate in such manner that one of the tube ends is flush with a first side of sides of the tube plate and the tube projects from a second, opposite side of the tube plate, the setting of the tube having been effected by a rolling of the wall of the tube inside the tube plate between the tube end flush with the first side of the plate and a zone located in the region of the second side of the plate, said process comprising directing onto an inner surface of the tube a stream of gas at high velocity charged with particles composed of a material having a hardness higher than the hardness of the material of the tube and having a particle size of between 50 and 500.10^{-6} m, in radial directions relative to the tube and throughout the periphery of the tube, the velocity of the gas of at least 50 m/sec at the moment of the impact on the inner surface of the tube and the density of the particles in said gas being such that the flow of the mass of the particles striking the inner surface of the tube for effecting de-stressing of the tube is higher than 0.008 kg/sec, and preferably than 0.010 kg/sec, for a tube having an inside diameter of substantially 0.020 meter, recovering and recycling the particles in a closed circuit after their impact on the inner surface of the tube and their travel toward the first side in the deformed part of the tube inside the tube plate.

4,706,357

VALVE SERVICING TOOL

James T. Ewing, 11096 57th Rd., North, Royal Palm Beach, Fla. 33411

Filed Nov. 13, 1985, Ser. No. 797,621
Int. Cl.[4] B23P *19/04*
U.S. Cl. 29—213 R 19 Claims



1. A tool for access to pressurized systems having a valve stem and a valve core therein, comprising:

a block member having a first passage therethrough;

engagement means affixed to the block member and operative to engage the valve stem and connect the first passage to the valve stem; and,

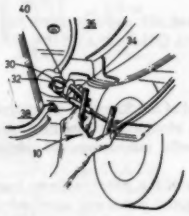
a slide member securely engaged to the block member and linearly slidable relative to the block member as so engaged, the block member and the slide member engaging one another through cooperating tongue and groove portions preventing displacement of the block member away from the slide member, the slide member having a second passage therethrough alignable with the first passage, the slide member and the block member being movable between one sliding position in which the respective passages align to define a straight opening extending to the valve core, and a second sliding position wherein the first and second passages are misaligned and the first passage is substantially sealed from the atmosphere by abutment with the slide member.

4,706,358

TOOL FOR REMOVAL OF RUBBER EXHAUST HANGERS

Daniel C. Johnson, West Chicago, and David J. Brummel, Warrenville, both of Ill., assignors to Maremont Corporation, Carol Stream, Ill.

Continuation of Ser. No. 787,516, Oct. 15, 1985, abandoned.
This application Mar. 11, 1987, Ser. No. 24,881
Int. Cl.[4] B23D *19/02*
U.S. Cl. 29—235 2 Claims



1. A vehicular exhaust hanger tool comprising:

an elongated, cylindrical guide member having a straight guide portion, an angled bracket abutting portion and a first cross bar formed a first handle; and

a hanger hook member having a cylindrical, tubular, annular guided portion slidably mounted on the guide portion of the guide member, between the bracket abutting portion and the first cross bar, a hanger hook curved away from bracket abutting portion, and a second cross bar forming a second handle;

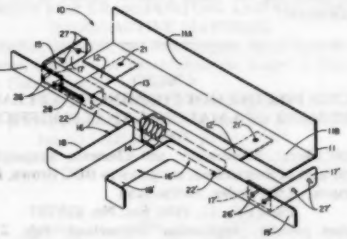
whereby the tool may be used to install and remove vehicular exhaust hangers from upper and lower mounting brackets by setting the bracket abutting portion of the guide member against the upper brackets, hooking the exhaust hangers with the hanger hook aligned and pointing in either the same direction or a 180 degree rotational direction relative to the bracket abutting portion, and pulling the hanger hook away from the bracket abutting portion, thereby stretching the exhaust hangers for speed and ease of installation and removal to and from the mounting brackets.

4,706,359

MOUNTING UTILITY BOXES, PANELS, AND THE LIKE

Daniel J. Greenhill, Sr., P.O. Box 1074, and Alfred J. Moore, Jr., P.O. Box 1903, both of Riverview, Fla. 33569

Filed Sep. 2, 1986, Ser. No. 902,731
Int. Cl.[4] B25B *27/14*
U.S. Cl. 29—271 24 Claims



1. Tool for mounting a utility box or panel between a pair of vertical structural members of a building or the like, comprising

laterally telescoping means biased toward increased width, means so biasing such telescoping means laterally outward, the telescoping means including

mutually parallel side members laterally extending to increased width under such bias to make supporting contact with the sides of such a pair of vertical structural members when the tool is partly interposed therebetween, and

a pair of mutually aligned front gauging members laterally extending to increased width under such bias to make gauging contact with the fronts of a pair of vertical structural members when the tool is otherwise partly interposed therebetween.

4,706,360

THREAD GAGE

E. Eugene Callens, Jr., Ruston; Leslie L. Crowson, Jr., Minden; Robert P. Kobs, Shreveport; Herbert G. Tull, III, Ruston, all of La., and Joseph F. Tahtouh, Houston, Tex., assignors to Morton Thiokol, Inc., Chicago, Ill.

Filed May 13, 1986, Ser. No. 862,859
Int. Cl.[4] G01B *7/28;* B23Q *15/02*
U.S. Cl. 29—407 23 Claims

23. A method of profiling a thread in a workpiece which is mounted in a workpiece holder of a threading machine which includes a turret movable in directions axially of the workpiece holder comprises the steps of:

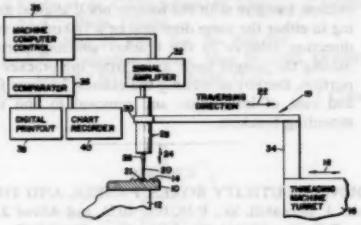
a. mounting a thread gage including a stylus on the turret,

b. moving the thread gage including the stylus into position to profile the thread,

c. moving the turret in a direction axially of the workpiece holder to effect movement of the stylus over the thread surface,

d. producing signals indicative of the positions axially of the turret during the movement of the stylus over the thread surface,

e. transmitting the signals to a machine computer,



f. producing signals indicative of the corresponding positions radially of the stylus during the movement of the stylus over the thread surface, and

g. transmitting the radial position signals to the machine computer.

4,706,361

PROCESS FOR THE HOT-FORMING OF AT LEAST ONE SHEET MADE OF A MATERIAL THAT IS DIFFICULT TO WORK

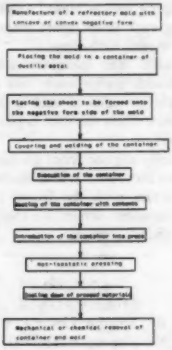
Gundolf Meyer, Birmenstorf, and Clemeens Verpoort, Fislisbach, both of Switzerland, assignors to BBC Brown, Boveri & Company, Ltd., Baden, Switzerland

Filed Feb. 12, 1986, Ser. No. 828,707

Claims priority, application Switzerland, Feb. 21, 1985, 795/85

Int. Cl.[4] B23P *17/04*

U.S. Cl. 29—423 **8 Claims**


Manufacture of a refractory mold with concave or convex negative form
Placing the mold in a container of ductile metal
Placing the sheet to be formed onto the negative form side of the mold
Covering and welding of the container
Evacuation of the container
Heating of the container with contents
Introduction of the container into press
Hot-isostatic pressing
Cooling down of pressed material
Mechanical or chemical removal of container and mold

1. A process for the hot forming of at least one sheet (5) made of a material that is difficult to work, using a mold (1) serving as negative form, wherein initially the mold (1) is made of a refractory material, covered at least with one sheet (5) that is to be formed and the whole is placed in a container (2) and tightly welded together under vacuum (6), and the body produced in this way is subjected to a hot-isostatic press process under external pressure from all sides at elevated temperature, at least one sheet (5) being pressed through at least one of the container walls (2) against the contour of the mold (1), and the whole is cooled after the press process and the formed container (7) as well as the mold (1) are removed by chemical and/or mechanical means.

4,706,362

METHOD OF ATTACHING TAGS

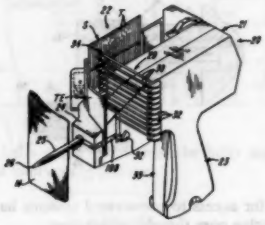
Larry D. Strausburg, Kettering, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Division of Ser. No. 654,333, Sep. 25, 1984, Pat. No. 4,673,120.

This application Sep. 22, 1986, Ser. No. 909,660

Int. Cl.[4] B23P *11/00, 17/00*; B65C *5/06*

U.S. Cl. 29—432 **8 Claims**



1. Method of attaching tags to merchandise using fasteners, with each fastener having a bar section and a button section joined by a filament section, comprising the steps of: providing a hand-held tag attacher having a hopper adapted to hold a stack of tags, a handle and a manually engageable actuator disposed at the handle, manually operating the actuator to move a bar section of a fastener through a tag at a waiting position and through merchandise, and manually re-operating the actuator to advance a tag from the hopper to the waiting position.

4,706,363

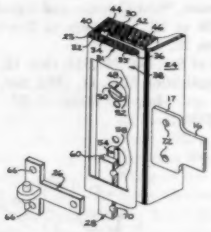
METHOD OF REINFORCING A STRUCTURAL ASSEMBLY

Benson T. Taylor, Jr., Floyd's Knobs, Ind., assignor to General Electric Company, Louisville, Ky.

Filed Sep. 9, 1986, Ser. No. 905,194

Int. Cl.[4] B23P *11/02*

U.S. Cl. 29—453 **11 Claims**



1. A method of reinforcing a structural assembly comprising:

forming an elongated panel having spaced front and rear metal walls interconnected along longitudinal edges thereof,

lancing one of the panel walls to form a tang transverse to the elongated panel and attached at one end to the wall and the opposite end free,

lancing one of the panel walls to form a resilient tang longitudinal to the elongated panel and spaced from the transverse tang and attached at one end to the wall and the opposite end free,

plastically bending both tangs away from their respective walls wall toward the other panel wall,

forming a reinforcing member having a length slightly less than the distance between the tangs and a thickness

slightly less than the distance between the front and rear walls of the panel,

sliding the reinforcing member longitudinally in the space between the front and rear walls of the panel over the longitudinal tang to abut the transverse tang whereupon the longitudinal tang will spring back and capture the reinforcing member between the tangs,

providing a structural member to be secured to the reinforcing member, and

securing the structural member to the reinforcing member through one wall of the panel.

4,706,364

PROCESS FOR CONNECTING AN ELEMENT TO ONE END OF A TUBE OF COMPOSITE MATERIAL AND DEVICE THUS OBTAINED

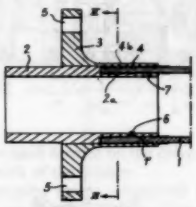
Jacques Aubry, Cabries, France, assignor to Societe Nationale Industrielle Aerospatiale, Paris, France

Filed Jan. 24, 1986, Ser. No. 822,240

Claims priority, application France, Jan. 28, 1985, 85 01130

Int. Cl.⁴ B32B *5/12*

U.S. Cl. 29—458 **10 Claims**



1. A process for connecting an element to an end of a tube having an annular cross-section, said element comprising a recess defined between two spaced apart coaxial cylindrical walls,

said process comprising the steps of intercalating a sleeve coated with a curable resin or elastomer between the walls of said recess and the inner and outer faces of said end of said tube, and

curing said resin or elastomer to interconnect said walls and said faces.

4,706,365

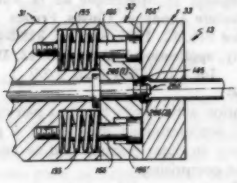
METHOD AND APPARATUS FOR ASSEMBLING A RING PIPE ARRANGEMENT

Robert D. Hooton, McMinnville, Tenn., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Oct. 20, 1986, Ser. No. 924,244

Int. Cl.⁴ B21D *39/00*; B23P *11/00*; B23Q *3/00, 7/04*

U.S. Cl. 29—520 **8 Claims**



1. The method of emplacing a ring upon the outer diameter of a selected pipe at a predetermined axial location, comprising the steps of:

(a) slipping the ring over the end of the pipe to the predetermined location,

(b) holding the end of the pipe to resist axial displacement,

(c) compressing the ring to reduce its diameter and that of the portion of the pipe at which it is positioned, and

(d) axially compressing pipe until it bulges adjacent the region of diameter reduction, whereby said ring is fixedly emplaced upon said pipe.

3. Apparatus for emplacing a selected ring at a predetermined location on a pipe, comprising:

means for holding said pipe at a selected location, and effective for defining an aperture wider than the diameter of the pipe and smaller than the outer diameter of said ring,

radial means for radially compressing said ring at a selected axial location of said pipe, whereby a circumferential depression is established in said pipe, and

axial means for axially compressing said pipe, said axial means effective for establishing a circumferential bulge in said pipe adjacent said circumferential depression,

whereby said ring is fixedly emplaced upon said pipe.

4,706,366

METHOD OF MANUFACTURING A DOUBLE-WALL CONTAINER INCLUDING A NEUTRON-ABSORBING SCREEN FOR TRANSPORTING AND STORING RADIO-ACTIVE MATERIAL

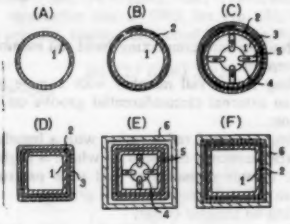
André Madiot, Soissons, and Joël Kerjean, Saint Herblin, both of France, assignors to Etablissements Lemer & Cie, Carquefou Cedex, France

Filed Apr. 24, 1985, Ser. No. 726,716

Claims priority, application France, Apr. 25, 1984, 84 06498

Int. Cl.⁴ B21D *39/00*; B21B *17/07*

U.S. Cl. 29—523 **12 Claims**



1. A method of manufacturing a double-wall container including a neutron-absorbing screen for enclosing radioactive material, the method comprising the steps of:

providing an inner tube and an outer tube of suitable shape and size for the inner tube to be received coaxially inside the outer tube, thereby causing the outside face of the inner tube to face the inside face of the outer tube;

fixing said neutron-absorbing screen to one of said faces;

inserting the inner tube into the outer tube; and

radially expanding the inner tube into the outer tube while leaving the outer tube externally free to expand, thereby plastically deforming both tubes and obtaining a solid single block assembly of desired shape and size for the container.

4,706,367

SYSTEM AND METHOD FOR MECHANICALLY JOINING HANDRAILING MEMBERS

Lester G. Garringer, Lakeland, Fla., assignor to Specialty Maintenance and Construction, Inc., Lakeland, Fla.

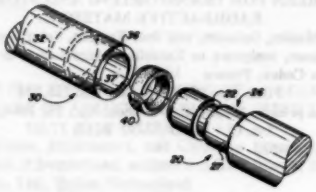
Filed Dec. 16, 1985, Ser. No. 809,205

Int. Cl.⁴ B23P *11/02*; F16B *7/10*

U.S. Cl. 29—526 R **13 Claims**

1. A mechanical joint structure for interconnecting rail members comprising:

(a) a first rail member with a male protrusion having an external circumferential groove on said male protrusion;
(b) a second rail member with a female end defined by a longitudinal hole shaped and dimensioned to receive said male protrusion and having an internal circumferential groove which aligns with said external groove of said male protrusion when said male protrusion is mated with said female end;
(c) an annular collar dimensioned to fit inside an annular void formed by said groove of said male protrusion and said groove of said female end, to prevent longitudinal movement of said first rail member relative to said second rail member;
(d) means including a beveled camming surface at the extremity of said protrusion for expanding said annular collar as said annular collar passes over said male protrusion into said external groove of said male protrusion into said external groove of said male protrusion; and
(e) means including an outer camming surface on said annular collar for contracting said annular collar within said external groove of said male protrusion as said female end passes over said annular collar until said annular collar is received by the internal groove of said female end.



12. A method for interconnecting hand rail members, comprising the steps of:
(a) providing a first rail member with a male protrusion having an external circumferential groove on said male protrusion;
(b) providing a second rail member with a female end, the inside cross-sectional diameter of which is slightly larger than the outside diameter of said male protrusion, and having an internal circumferential groove;
(c) providing an annular collar;
(d) providing beveled camming surfaces with said first and second rail members and said collar;
(e) simultaneously pushing said protrusion into said female end and camming said collar over the extremity of said protrusion, and then sliding said annular collar over said male protrusion into said external groove of said male protrusion;
(f) thereafter compressing said annular collar by camming said annular collar into said external groove of said male protrusion; and
(g) sliding said female end over said male protrusion and said compressed annular collar in order to align said internal circumferential groove of said female end with said annular collar.

4,706,368

INFUSION PUMP/CONTROLLER FLOW SENSOR SUPPORT BRACKET

John S. Crissman, III, Union Lake; Lyle N. Windingland, Rochester Hills, and Natalie A. Kribs, Royal Oak, all of Mich., assignors to William Beaumont Hospital, Royal Oak, Mich.

Filed Jan. 21, 1986, Ser. No. 820,324
Int. Cl.[4] B23P *19/00*
U.S. Cl. 29—526 R **1 Claim**

1. A method for supporting the drop chamber of an IV fluid administration system having a vertically extending IV pole, an administration bag having said drop chamber attached thereto, and a flow sensor attached to said drop chamber for monitoring the presence of fluid in said drop chamber, comprising the steps of:
providing a vertically extending IV pole, an administration bag associated with said vertically extending IV pole, a drop chamber having a fluid flow path associated with said administration bag, and a flow sensor attached to said drop chamber for monitoring the presence of fluid flow in said drop chamber fluid flow path,
providing a rigid support bracket having an elongated arm section, a first clamping member adapted to be removably secured to said IV pole, and a second clamping member adapted to be removably secured to said flow sensor,
orientating said first clamping member with respect to said IV pole such that said first clamping member is clamped

to said IV pole along a substantially vertical axis, thereby orientating said second clamping member with respect to said first clamping member such that said second clamping member clamps along an axis substantially perpendicular to said first clamping axis,
attaching said first clamping member to said IV pole,
attaching said second clamping member to said flow sensor such that said drop chamber fluid flow path is substantially parallel to said IV pole, and
preventing movement of said first clamping member and said second clamping member with respect to said arm section so that said rigid support bracket, when attached to both said IV pole and said flow sensor, supports said flow sensor and said drop chamber to maintain said drop chamber and fluid flow path in a desired orientation.

4,706,369

FAST-ACTION MULTIPLE TAPPING MACHINE

Gerard Lavorel, Pringy, France, assignor to Ateliers de Decoupage, Emboutissage et Mecanique de la Vallee de l'Arve ADEMVA, Societe Anonyme, Cluses, France

Filed Feb. 12, 1986, Ser. No. 828,840
Claims priority, application France, Feb. 12, 1985, 85 01948
Int. Cl.[4] B23G *1/20, 3/00*
U.S. Cl. 29—560 **9 Claims**

1. In combination with a press having a pair of platens movable through a predetermined distance in a predetermined direction between an outer position and an inner position, a tapping machine comprising:
a base plate fixed to one of the platens;
a spindle member extending along a spindle axis between the platens in the direction;
a nut member threaded on the spindle member, one of the members being rotatable asbout the spindle axis on the base plate and the other member being fixed nonrotatably

about the spindle axis on the other platen, whereby relative displacement of the platens rotates the one member in the base plate;

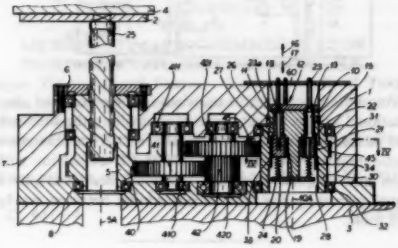
an element displaceable on the base plate along an element axis but nonrotatable on the base plate about the element axis, the element having an external screwthread centered on the element axis;

an internally threaded drive sleeve in continuous-mesh engagement with the external thread of the nut;

at least one tap holder generally fixed relative to the element axis in the element and rotatable in the element about a respective tap axis parallel to the element axis;

a tap fixed axially and rotationally in the holder and of a predetermined pitch;

respective drive teeth formed on the holder;



internal drive teeth formed on the drive sleeve and meshing with the teeth of the holder;

rotary transmission means operatively connected between the rotary one member and the drive sleeve for synchronously rotating the holder and its tap at a predetermined tap rotation rate about the tap axis on rotation of the one member about the spindle axis; and

axial-feed transmission means operatively connected between the rotary one member and the drive sleeve for synchronously axially advancing the element with the tap and tap holder on displacement of the platens from the outer position to the inner position through a predetermined tap stroke equal to a fraction of the press stroke and at a rate such that the tap are rotated through substantially only one revolution while being advanced through a distance equal to the pitch.

4,706,370

CUTTING AND MOUNTING APPARATUS

Dietmar Blättner, Schwaikheim; Hermann Dieterle, Esslingen; Manfred Leutwein, Kernen, and Horst Simon, Fellbach, all of Fed. Rep. of Germany, assignors to Eastman Kodak Company, Rochester, N.Y.

PCT No. PCT/DE85/00363, § 371 Date May 28, 1986, § 102(e) Date May 28, 1986, PCT Pub. No. WO86/02178, PCT Pub. Date Apr. 10, 1986

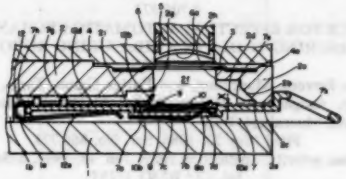
PCT Filed Oct. 4, 1985, Ser. No. 871,418

Claims priority, application Fed. Rep. of Germany, Oct. 5, 1984, 3436538

Int. Cl.[4] B23Q *7/00*

U.S. Cl. 29—564.2 **5 Claims**

1. In a cutting and mounting apparatus for cutting a film section which is then lowered into a slide mount, said apparatus comprising a cutting tool including a cutting plate disposed in a cover plate, a slide member disposed in a guide channel beneath the cover plate, said slide member being provided with a recess in the upper surface thereof for receiving a slide mount, said slide member being arranged to move between a first position wherein the slide mount is disposed in alignment with and beneath said cutting plate and a second position wherein the slide mount is disposed exteriorly of said apparatus, and a guiding jaw member disposed between said cutting plate and said slide member and arranged to engage a film section disposed on the upper surface of a slide mount carried by said slide member so that, as the slide member is moved in said guide channel to withdraw the slide mount from the apparatus, said film section is engaged and deflected by said guiding jaw member and is snapped into said slide mount, the improvement comprising a resilient clip component shiftably mounted



on the trailing end of said slide member, said clip component being provided with guiding finger elements pointing in the direction of movement of the slide member to the second position, said clip component arranged so that when the slide member is in the first position the finger elements resiliently rest on the trailing edge of said slide mount and when the slide member is in the second position the finger elements release the slide mount.

4,706,371

MACHINE TOOL

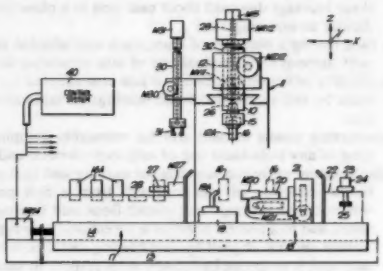
David R. McMurtry, Gloucestershire, England, assignor to Renishaw Electrical Limited, Wotton-Under-Edge, England

Continuation of Ser. No. 473,142, Mar. 7, 1983, abandoned. This application Dec. 2, 1985, Ser. No. 803,783

Claims priority, application United Kingdom, Mar. 10, 1982, 8206952

Int. Cl.[4] B23Q *3/157*

U.S. Cl. 29—568 **3 Claims**



1. A machine tool comprising:

a spindle having an axis of rotation;

a support defining a machining location;

means for moving said spindle and said support one relative to the other in each of three mutually perpendicular directions, one of said directions being the direction of said axis;

a magazine for supporting a plurality of workpieces and situated in a position remote from said support;

means for moving said spindle and said support one relative to the other in at least one of the other said directions between a position in which said spindle is situated adjacent said support and a position in which said spindle is situated adjacent said magazine;

means for moving said spindle and said magazine one relative to the other in said one direction;

gripper means provided on said spindle; and

means for operating said gripper means to grip and release a

workpiece at least when said spindle is situated adjacent said magazine;

wherein said magazine and said spindle are so arranged that, when said spindle is situated adjacent said magazine, a workpiece is directly transferable between the magazine and the gripper means by said relative movement of said spindle in said one direction.

4,706,372

DEVICE FOR EFFECTING AUTOMATIC EXCHANGE OF MEASURING TOOLS IN A MEASURING ROBOT OR MACHINE

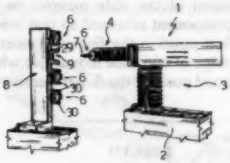
Franco Ferrero, Moncalieri, and Enrico Garau, Turin, both of Italy, assignors to D.E.A. Digital Electronic Automation S.p.A., Moncalieri, Italy

Filed May 23, 1986, Ser. No. 866,771

Claims priority, application Italy, Jun. 11, 1985, 67543 A/85

Int. Cl.[4] B23Q *3/155*

U.S. Cl. 29—568 **13 Claims**



1. For use in conjunction with a measuring machine including a movable measuring arm; and in conjuction with a plurality of measuring tools supportable one at a time by said arm, each tool possessing a tool axis; the combination comprising:

a plurality of tool carriers each receiving an individual one of said measuring tools thereon, each carrier including a tang defining a tang axis, said tang axis being substantially coincident with the tool axis of the individual tool received on each tool carrier, and each carrier including three bearings disposed about said tang in a plane perpendicular to said tang axis;

a rack having a plurality of seats, each seat adapted to support thereon an individual one of said measuring tools;

a plurality of bearing surfaces on said arm adapted for abutment by and alignment of said bearings on said tool carriers;

connecting means on said arm for releasably gripping the tang of any individual one of said tool carriers; and

displacement means on said arm for moving said tool carrier in the direction of said tool axis from a first position whereat said bearings are spaced from said bearing surfaces, and to a second position whereat said bearings abut against and are aligned by said bearing surfaces, whereby said tool is positioned precisely with respect to said arm.

4,706,373

NUMERICAL-CONTROL MACHINING CENTER FOR STRUCTURAL SECTIONS

Francois Andriussi, Latresne, France, assignor to Promat Industrie, Latresne, France

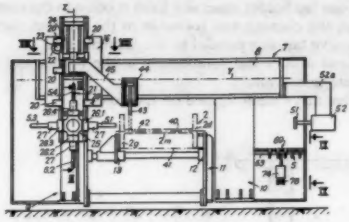
Filed Jul. 29, 1985, Ser. No. 760,133

Claims priority, application France, Aug. 8, 1984, 84 12556

Int. Cl.[4] B23Q *3/157*; B23B *49/00*; B23C *1/12*

U.S. Cl. 29—568 **9 Claims**

1. Apparatus for machining holes in a workpiece including in combination a machining station, means for moving the workpiece to a predetermined position relative to the station along an X axis of a coordinate system having mutually orthogonal X and Y and Z axes, means operable during hole machining to maintain the workpiece at said X position, the station including a plurality of tools rotating about axes disposed in the YZ plane, each tool having a hole machining end, the rotational axes of the tools intersecting at a point and the hole machining ends extending away from said point, first means for translating the tools along the Y axis, second means for translating the tools along the Z axis, means for swiveling the tools about said point to select one tool for hole machining duty and to orient the selected tool such that its rotational axis makes a predetermined angle relative to the Z axis, means operable



during hole machining to translate the selected tool along its rotational axis by simultaneously controlling the first and second means to produce incremental Y and Z translations, and a probe mounted for concomitant Y and Z translation with the tools and adapted to engage the workpiece and provide a signal indicating the relative positioning between workpiece and tools.

4,706,374

METHOD OF MANUFACTURE FOR SEMICONDUCTOR ACCELEROMETER

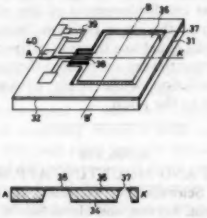
Koichi Murakami, Yokosuka, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Sep. 27, 1985, Ser. No. 780,933

Claims priority, application Japan, Oct. 19, 1984, 59-218495

Int. Cl.[4] H01L *21/467, 29/84*

U.S. Cl. 437—225 **9 Claims**



1. A method of manufacture for a semiconductor accelerometer with a cantilevered beam comprising:

a step of providing an upper semiconductor layer of a first conductivity type on a semiconductor substrate of a second conductivity type opposite to the first conductivity type;

a step of providing an electrode in ohmic contact with the upper layer;

a step of forming a patterned region of the second conductivity type encompassing the external shape of a region to be the cantilevered beam in the upper layer;

a step of forming a strain detecting means on the substrate;

a step of providing a mask on the lower surface of the semiconductor substrate;

a step of immersing the substrate with a cathode into etching solution in a condition that a voltage is applied between the electrode and the cathode to carry out an electrochemical etching such that the semiconductor substrate is etched to form the cantilevered beam.

4,706,375
METHOD OF FORMING A SOLID TANTALUM CAPACITOR

Walter J. Bernard, and E. James Fresia, both of Williamstown, Mass., assignors to Sprague Electric Company, North Adams, Mass.

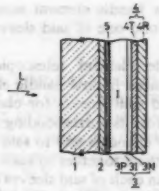
Filed Aug. 15, 1986, Ser. No. 896,686
Int. Cl.[4] H01G *9/06, 9/10, 13/04*
U.S. Cl. 29—570.1 **5 Claims**

1. A process for improving the dielectric properties of a solid-electrolyte tantalum capacitor, said process comprising providing a capacitor section soldered into an impervious can having an opening in an end thereof, soldering into said opening a seal having an open eyelet, introducing a controlled amount of water through said eyelet into said can, and thereafter hermetically sealing said eyelet.

4,706,376
METHOD OF MAKING SEMICONDUCTOR PHOTOELECTRIC CONVERSION DEVICE

Shumpei Yamazaki, and Susumu Nagayama, both of Tokyo, Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

Division of Ser. No. 725,742, Apr. 22, 1985. This application Nov. 18, 1986, Ser. No. 932,082
Claims priority, application Japan, Apr. 20, 1984, 59-79622
Int. Cl.[4] H01L *31/18*
U.S. Cl. 437—4 **1 Claim**



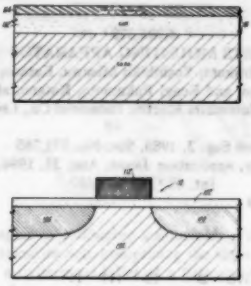
1. A method for manufacturing a semiconductor photoelectric conversion device comprising the steps of:
forming a first impurity doped non-single crystal semiconductor layer of a first conductivity type on a substrate;
forming an intrinsic non-single crystal semiconductor layer on said first semiconductor layer;
forming a second impurity doped non-single crystal semiconductor layer of a second conductivity type opposite to said first conductivity type on said intrinisc layer;
irradiating the outer surface of said second impurity doped semiconductor layer with light energy of suitable wavelength which is effective to selectively crystallize said second impurity doped layer;
irradiating the outer surface of said second impurity doped semiconductor layer with light energy of suitable wavelength which is effective to selectively crystallize said intrinsic semiconductor layer, whereby only the portion of said intrinsic semiconductor layer adjacent said second impurity doped semiconductor layer is crystallized.

4,706,377
PASSIVATION OF GALLIUM ARSENIDE BY NITROGEN IMPLANTATION

Alexander J. Shuskus, West Hartford, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Jan. 30, 1986, Ser. No. 824,683
Int. Cl.[4] H01L *29/56, 21/265*
U.S. Cl. 437—24 **6 Claims**

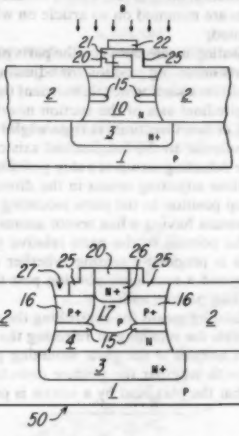
1. A method of electrically passivating a gallium arsenide surface of a gallium arsenide body comprising the steps of:
implanting a predetermined dose of nitrogen ions into said gallium arsenide body through said surface to form a nitrogen-doped subsurface layer in said gallium arsenide body, and heating said body, whereby at least some of said nitrogen replaces at least some of the arsenic in said gallium arsenide body in said subsurface layer to form a passivating layer partially composed of gallium nitride.



4,706,378
METHOD OF MAKING VERTICAL BIPOLAR TRANSISTOR HAVING BASE ABOVE BURIED NITRIDE DIELECTRIC FORMED BY DEEP IMPLANTATION

Robert H. Havemann, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation-in-part of Ser. No. 696,378, Jan. 30, 1985, abandoned. This application Mar. 26, 1985, Ser. No. 716,296
Int. Cl.[4] H01L *21/265, 21/20*
U.S. Cl. 437—24 **22 Claims**



1. A process for fabricating a vertical pipolar transistor with a base-on-insulator structure, comprising the steps of:
providing a substrate including a buried layer of a first conductivity type which serves as the collector of said transistor:
providing a masking layer over said substrate to expose only a portion thereof, and implanting nitrogen atoms into said substrate where exposed by said masking layer to selected depth which is shallower than the depth of the uppermost portion of said buried layer to react with said substrate to form insulator regions:
implanting dopant ions of a second conductivity type into said substrate to form a base region at a depth such that

portions of said insulator regions formed by said nitrogen implanting step lie under said base region: and

implanting ions of said first type into said substrate to form an emitter region.

4,706,379

PARTS MOUNTING APPARATUS

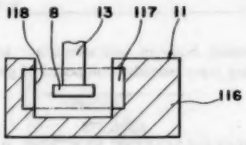
Makito Seno, Hirakata; Yoshihiko Misawa, Katano; Yoshinobu Maeda, Katano, and Kengi Fukumoto, Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Sep. 3, 1985, Ser. No. 771,765

Claims priority, application Japan, Aug. 31, 1984, 59-183026

Int. Cl.[4] H05K *3/30*

U.S. Cl. 29—740 **20 Claims**



1. A parts mounting apparatus, comprising:

a plurality of suction nozzles for picking up and holding the parts;

nozzle moving means on which said suction nozzles are mounted for intermittently moving said suction nozzles along a closed path to stop positions arranged at predetermined set intervals along said path, said stop positions including a parts pickup position at which parts are picked up by said suction nozzles and a parts mounting position at which parts are mounted on an article on which parts are to be mounted;

a position adjusting means between the parts pickup position and the parts mounting position for adjusting the position of a part held on a suction nozzle to orient the part relative to the longitudinal axis of the suction nozzle, the adjustment being in two directions at right angles to each other and perpendicular to the longitudinal axis of the nozzle;

a part posture detecting means at a stop position downstream of the position adjusting means in the direction from the parts pickup position to the parts mounting position, said detecting means having a line sensor means for detecting whether the posture of the parts relative to the suction nozzle axis is proper by sensing whether or not a part extends beyond a maximum position past the end of the corresponding nozzle; and

a suction regulating means for controlling the suction to said suction nozzle for retaining or releasing the parts held by the suction nozzles at the parts mounting position in accordance with whether the posture detecting means has detected that the part held by a nozzle is proper or not.

4,706,380

DRIVER APPARATUS

James C. Fall, 9531 Melvin Ave., Northridge, Calif. 91324

Continuation of Ser. No. 567,232, Dec. 30, 1983, abandoned. This application Oct. 8, 1986, Ser. No. 916,643

Int. Cl.[4] B23Q *7/10*

U.S. Cl. 29—813 **14 Claims**

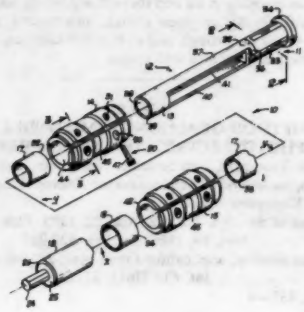
1. In an apparatus for forming a hanger and having a hollow handle constituting a magazine for a wire to be formed into a hanger, a magazine loader having at least one doorway accessing the magazine, and a recessed head securely mounted on the magazine loader for retaining an eye screw, the wire adapted to pass through the eye of the screw supported in said recessed head,

the improvement comprising

at least two sleeves each being longitudinally split and spaced one from the other in the apparatus, each sleeve including a large bore and a small bore and a ledge separating such bores,

an annular support member on said magazine loader mounted within the large bore of a first one of said sleeves to seat on its ledge,

a first-sized hollow handle element having its opposing ends mounted within the small bore of said sleeves,



a second-sized hollow handle element mounted within the large bore in a second one of said sleeves to seat on its ledge,

the first-sized handle element telescopically adjustable within the second-sized hollow handle element,

means in each of said split sleeves for clamping its corresponding sleeve across its corresponding split to such first and second hollow elements and to said annular support member to secure them together as such apparatus, and

a chambered surface in each of said sleeves along the spaced edges intersecting the interior wall surfaces forming its longitudinally-disposed split.

4,706,381

MULTI CONTACT CONNECTOR HAVING GROUND TERMINAL BLOCK CONNECTED WITH TAPE WIRES AND METHOD OF CONNECTING TAPE WIRES TO MULTI CONTACT CONNECTOR

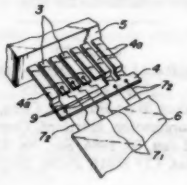
Matsuo Kato, Utsunomiya; Tomonari Ohtsuki, Mooka; Kazuya Hashimoto, Machida, and Masami Nakaide, Odawara, all of Japan, assignors to Daiichi Denshi Kogyo Kabushiki Kaisha and Hitachi, Ltd., both of, Japan

Filed May 16, 1986, Ser. No. 864,191

Claims priority, application Japan, May 23, 1985, 60-109376

Int. Cl.[4] H01R *11/00*

U.S. Cl. 29—857 **6 Claims**



1. A multi contact connector having a ground terminal block and signal and power source terminals to which are connected the terminal ends of bare wires of at least one tape wire, said connections exposed, said bare wires connected to said signal

and power source terminals having a greater slack than said bare wires connected to said ground terminal block so that any tensile forces acting upon said tape wire or said ground terminal block are absorbed by said wires connected to said ground terminal block and not by said wires connected to said signal and power source terminals, said bare wires being oriented substantially perpendicular to said ground terminal block.

6. A method of connecting at least one tape wire having a plurality of bare wires to a multi contact connector having a ground terminal block and signal and power source terminals, comprising:

connecting terminal ends of selected bare wires of said tape wire substantially linearly and in substantially perpendicular orientation to said ground terminal block, said selected bare wires having a designated slack; and

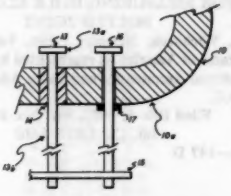
connecting terminal ends of the remaining bare wires of said tape wire to said signal and power source terminals in substantially perpendicular orientation to said ground bar with a slack, such that the slack of the bare wires connected to the ground terminal block is less than the slack of the bare wires connected to said signal and power source terminals.

4,706,382

ASSEMBLY FOR PACKAGING MICROCIRCUITS HAVING GOLD PLATED GROUNDING AND INSULATING LEADS, AND METHOD

Albert V. Suppinger, Easton, and Charles W. Tinley, Cambridge, both of Md., assignors to North American Philips Corporation, New York, N.Y.

Filed Sep. 3, 1985, Ser. No. 772,074
Int. Cl.[4] H01R *43/20*
U.S. Cl. 29—879 **8 Claims**



1. A method for producing a metal assembly for packaging microcircuits, the assembly comprising a header and a plurality of leads extending through a wall of the header, including at least one grounding lead attached to the header by an electrically conductive material, and a plurality of insulated leads attached to the header by an electrically insulating material, the method comprising the steps of:

(a) attaching a plurality of leads to the wall of the header with an electrically insulating material to insulate the attached leads from the header;

(b) electroplating a layer of nickel onto the assembled header and insulated leads;

(c) electroplating a layer of gold onto the electroplated nickel layer on the insulated leads;

(d) successively electroplating layers of nickel and gold onto the lead to be grounded; and

(e) thereafter attaching the electroplated lead to be grounded to the wall of the header.

4,706,383

ELECTRICAL CONTACT ASSEMBLY WITH COMPOSITE CONTACT CONSTRUCTION

Akbar Saffari, Freeport, Ill., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 27, 1986, Ser. No. 923,799
Int. Cl.[4] H01R *43/02*
U.S. Cl. 29—879 **17 Claims**

1. A method of producing a nonwelding contact assembly for an electrical switch, comprising the steps of:

forming a cylindrical billet of a first non-welding metallic material;

forming a tubular section of a second metallic material having good welding properties configured to fit over said cylindrical billet;

inserting said cylindrical billet into said tubular section to form a slug having a core of the first material and a sheath of the second material;

extruding said slug at an elevated temperature to form a wire having an outer layer of the second material metallurgically bonded to a core of the first material;

forming a switch contact carrier;

welding a segment of said wire containing sufficient material to form a desired contact configuration to said contact carrier; and

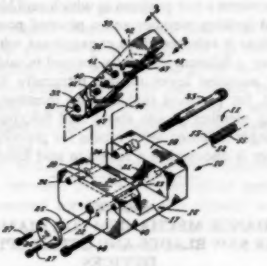
coining the segment of wire welded to the contact carrier to form a contact having an electrical contact surface thereon.

4,706,384

TOOL FOR CUTTING COAXIAL CABLE

Karl R. Schreiber, New Lenox, Ill., and Brian K. Harwood, Schererville, Ind., assignors to Andrew Corporation, Orland Pk., Ill.

Filed Aug. 5, 1986, Ser. No. 893,250
Int. Cl.[4] B21F *13/00*
U.S. Cl. 30—91.2 **12 Claims**



1. A tool for facilitating the stripping of elongated coaxial cable of generally circular cross-section and having a center conductor surrounded by an inner insulating sheath which, in turn, is surrounded by an outer sheath, said tool being operable to cut both through said outer and inner sheaths at a predetermined distance from one end of said cable and being operable to cut through said outer sheath at a greater distance from said one end of said cable, said tool comprising, in combination, a fixture having a base and having first and second ears spaced from one another and projecting upwardly from said base

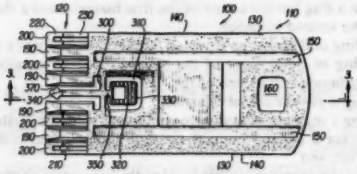
whereby an upwardly opening pocket of generally U-shaped cross-section is defined between said ears, means on said first ear and said base for confining said tool and said cable for relative rotation about the axis of the cable, adjustable means on said second ear for engaging one end of said cable and adjustably locating said cable in a predetermined lengthwise position in said pocket, a blade holder supported by said fixture to move between active and inactive positions, said blade holder having first and second spaced blades which are located adjacent said first and second ears, respectively, when said holder is in said active position, and means locating said blades on said holder and causing said second blade to cut into said cable to a greater depth than said first blade when said holder is moved to said active position.

4,706,385

ONE PIECE RAZOR BLADE HOLDER

Clemens A. Iten, Staunton, Va., assignor to American Safety Razor Company, Verona, Va.

Filed Feb. 28, 1986, Ser. No. 834,521
Int. Cl.[4] B26B *29/00*
U.S. Cl. 30—169 **5 Claims**



1. A one-piece blade holder comprising:
a handle portion;
a plurality of opposed, interdigitated finger member means, integrally formed with and extending from said handle portion, for holding a blade having a cutting edge in either one of a cutting edge exposed or a cutting edge protected position;
a pivotable locking member, integrally formed with said handle portion and, having means for engaging said blade in either of said positions, said locking member having means for releasably engaging said blade and being pivotable between a rest position in which said blade is engaged by said locking member and a pivoted position in which said blade is released from engagement with said locking member, a fulcrum integrally formed in said handle; and a finger actuated lever means, integrally formed in said handle, for pivoting said locking member; wherein said locking member pivots about said fulcrum and wherein said finger actuated lever means for pivoting said locking member is disposed in a recess in said handle portion.

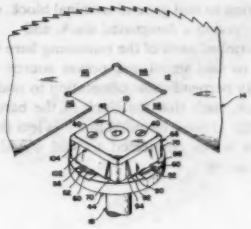
4,706,386

QUICK CHANGE MECHANISM FOR DIAMOND ARBOR CIRCULAR SAW BLADES AND OTHER SPINNING DISC DEVICES

Edward R. Wiley, 9020 SE. 51st Pl., Mercer Island, Wash. 98040

Filed Aug. 28, 1986, Ser. No. 902,415
Int. Cl.[4] B27B *5/32*
U.S. Cl. 30—388 **6 Claims**

1. A quick change mechanism to change rotatable work contacting members which have diamond arbor center holes, such as circular saw blades, grinders, buffers, brushes, with respect to the drive shafts of power tools, comprising the axially arranged assembly of:
(a) a base which is adapted to fit over a saw drive shaft and positioned adjacent to a saw body of a power tool and which is formed with a cross recess to position an ejector spring;
(b) an ejector spring having four spaced legs terminating in respective upturned lips, which fits into the cross recess of the base and around a saw drive shaft;
(c) a diamond shaped body block which is adapted to fit over a drive shaft of a power tool and be positioned adjacent the ejector spring and having at its corners respective saw blade positioning lugs to fit corners of a diamond shaped arbor center hole of a circular saw blade;
(d) a lock spring which is adapted to fit over a saw drive shaft of a power tool and in contact with the ejector



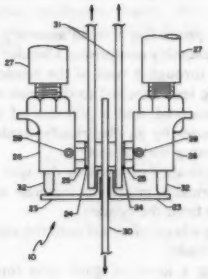
spring legs and lips, and arranged as a top with four side depending lock spring leafs, each lock spring leaf having a leaf ridge and a leaf lip;
(e) a retaining cap which is adapted to fit the top of a saw drive shaft of a power tool and be positioned adjacent the top of the lock spring, and present a surrounding top edge camming surface and have a central hole adapted to receive an installation bolt; and
(f) two assembly bolts arranged respectively through two spaced aligned holes in each retaining cap, lock spring, body block, and threaded into aligned holes of the base, complete the assembly of this embodiment of the quick change mechanism.

4,706,387

DEVICE FOR MEASURING HOLE ELONGATION IN A BOLTED JOINT

Gregory R. Wichorek, Newport News, Va., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Feb. 5, 1987, Ser. No. 10,950
Int. Cl.[4] G01B *5/30*
U.S. Cl. 33—147 D **4 Claims**



1. A device for measuring hole elongation in a test specimen comprising:
reference angles fixed to said test specimen;

two load transfer plates, each having a hole corresponding to the test specimen hole and positioned in alignment with the test specimen hole;

two spacer washers placed between the test specimen and each load transfer plate;

a means for connecting said test specimen, said spacer washers, and said load transfer plates which passes through the load transfer plate holes, the spacer washers, and the test specimen hole to form a load transfer plate/spacer washer/test specimen/spacer washer/load transfer plate sandwich;

two cylindrical head nuts positioned on both ends of said means for connecting said test specimen, said spacer washers, and said load transfer plates;

a means for measuring linear displacement of said reference angles;

a means for connecting said means for measuring linear displacement of said reference angles to said cylindrical head nuts positioned on both ends of said means for connecting said test specimen, said spacer washers, and said load transfer plates, so that said means for measuring linear displacement of said reference angles remains in contact with said reference angles;

the centerline of said means for measuring linear displacement being parallel to the axes of said test specimen and said load transfer plates and perpendicular to the centerline of said means for connecting said test specimen, said spacer washers, and said load transfer plates, all centerline axes being in the same plane.

4,706,388

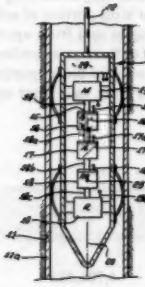
BOREHOLE INITIAL ALIGNMENT AND CHANGE DETERMINATION

Donald H. Van Steenwyk, San Marino, Calif., assignor to Applied Technologies Associates, San Marino, Calif.

Division of Ser. No. 635,612, Jul. 30, 1984, Pat. No. 4,611,405, which is a continuation-in-part of Ser. No. 293,159, Aug. 17, 1981, Pat. No. 4,468,863. This application Aug. 23, 1985, Ser. No. 768,746

Int. Cl.[4] G01C *19/38*

U.S. Cl. 33—304 **10 Claims**



1. In borehole survey apparatus, the combination comprising:

(a) angular rate sensor means having a sensitive axis,

(b) tilt sensor means,

(c) a rotary drive operatively connected to said rate sensor means and said tilt sensor means to rotate said rate sensor means and said tilt sensor means about an axis extending generally in the direction of the borehole,

(d) circuitry operatively connected with said rate sensor means and said tilt sensor means to determine the azimuthal direction of tilt of the borehole at a first location therein,

(e) drive control circuitry and switch means operatively connected with said rate sensor means and said tilt sensor means whereby said rate sensor means and said tilt sensor means may also be connected in feedback relation with the drive whereby an axis defined by a support for the rate sensor means is maintained at a predetermined orientation relative to horizontal during travel of said apparatus in the borehole relative to said first location,

(f) and integration circuitry connected with said rate sensor means whereby changes in borehole alignment during said travel may be determined.

4,706,389

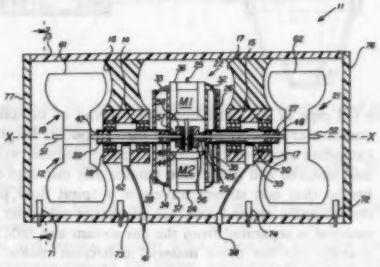
ATTITUDE DISPLACEMENT MEASUREMENT APPARATUS

Karl P. Eisenhammer, 60 Rosemere Rd., Cumberland, R.I. 02864

Filed Aug. 20, 1986, Ser. No. 898,095

Int. Cl.[4] G01C *22/00*

U.S. Cl. 33—318 **21 Claims**



1. Attitude displacement measurement apparatus comprising:

a base means;

primary bearing means retained by said base means;

auxiliary bearing means mounted for rotation on said primary bearing means on a given axis with respect to said base means;

a first rotor means mounted for rotation on said auxiliary bearing means on said given axis;

a second rotor means mounted for rotation on said auxiliary bearing means on said given axis;

a first drive means coupled to said first rotor means and operable to produce rotation thereof on said auxiliary bearing means in one sense on said given axis;

a second drive means coupled to said second rotor means and operable to produce rotation thereof on said auxiliary bearing means on said given axis in a sense opposite to said one sense; and

measurement means for measuring the magnitude of the difference between the relative rotational speeds of said first and second rotor means with respect to said base means.

4,706,390

DEHYDRATOR

John A. Kitchen, R.R. #3, Hastings, Ontario, Canada (K0L 1Y0), assignor to John A. Kitchen Ltd., Hastings, Canada

Filed Apr. 14, 1986, Ser. No. 851,171

Int. Cl.[4] F26B *17/00*

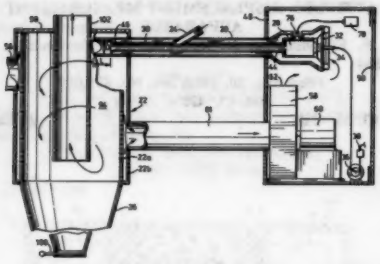
U.S. Cl. 34—57 R **17 Claims**

1. A dehydrator comprising:

a pulse combustor including a combustion chamber and an elongate tail pipe forming a resonant system with the combustion chamber, the tail pipe having an inlet for fluent material to be dehydrated and an outlet through

which the material is discharged in a pulsating exhaust gas stream when the combustor is in operation; and,

a cyclone separator including: a cyclone chamber having a cylindrical wall extending about a generally vertical axis, a closed upper end wall, and an inlet defined by the tail pipe of the combustor; dried material collection means at a lower end of said chamber; a gas discharge tube disposed generally centrally of the chamber and extending to a gas outlet from the separator; and means for discharging gases from the separator through said tube;



the tail pipe of the pulse combustor being of substantially constant cross-sectional shape throughout its length and extending tangentially into the cyclone chamber to direct said material and gas stream tangentially into said chamber so that said stream travels in a spiral flow pattern downwardly around said gas discharge tube and dried material is separated from the gas stream and falls under gravity into the dried material collection means while gases leave the chamber through said gas discharge tube.

4,706,391

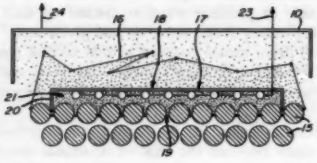
HEAT COLLECTOR FOR THE DRYER SECTION OF A PAPERMAKING MACHINE

John C. Urbas, Front Road, R.R. #2, Hawksbury, Ontario, Canada K6A 2R2

Filed Oct. 15, 1986, Ser. No. 919,008

Int. Cl.[4] F26B *13/08*

U.S. Cl. 34—114 **13 Claims**



1. in a papermaking machine comprising a drying section wherein a hood covers a series of dryer drums supported by a frame, said dryer drums supporting a continuous sheet of pulp to be dried, the improvement consisting of at least one heat collector disposed under said hood in close proximity to said dryer drums for collecting high quality, high temperature heat generated and concentrated in the immediate vicinity of said dryer drums; said heat collector defining an enclosure having base walls, side walls and ends wherein one of said base walls is constituted by a plurality of said dryer drums, and exhaust means in communication with said enclosure to evacuate the high quality heat collected within said heat collector from the low quality heat collected by said hood and transport same away from said drying section.

4,706,392

INTERCHANGEABLE SHOE AND SLIPPER COMBINATION

Tzu-Tsan Yang, P.O. Box 13-118, Taipei, Taiwan

Filed Oct. 20, 1986, Ser. No. 921,045

Int. Cl.[4] A43B *3/24, 3/12, 21/38*

U.S. Cl. 36—101 **2 Claims**

1. An interchangeable shoe and slipper combination comprising: an upper, a sole, a detachable heel means fixed under the sole, and a separable slide fastener adapted to couple or uncouple the upper and the sole, the improvement which comprises:

said upper including a front upper portion adapted for covering a wearer's toes having the lower perimeter of said front upper portion secured on the sole, and a rear upper portion coupled to said front upper portion by said slide fastener;

said slide fastener including a lower strip having a front strip portion formed on an opening edge of said front upper portion and having a rear strip portion formed on the rear edge of said sole, and an upper strip having a front strip portion operatively coupled to the front strip portion of said lower strip and having a rear strip portion operatively coupled to the rear strip portion of said lower strip, and a coupler which couples said front upper portion with said rear upper portion to form an assembled shoe and adapted to uncouple the two said upper portions to separate said rear upper portion from said front upper portion to become a slipper.

4,706,393

SKI BOOT FASTENER

Herbert Marxer, Schaan, Liechtenstein, assignor to Lange International S.A., Fribourg, Switzerland

Filed Nov. 3, 1986, Ser. No. 926,322

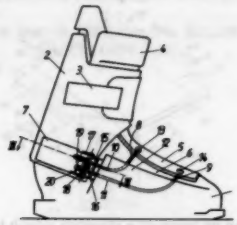
Claims priority, application Switzerland, Jan. 23, 1986, 267/86

Int. Cl.[4] A43B *5/04;* A43C *11/00*

U.S. Cl. 36—117 **10 Claims**

1. Fastener for releasably closing two portions of a sports boot, which comprise stretching means attached to one portion of the boot and adapted to control a pair of cables (**8, 9**) having one end anchored to the other portion of the boot, wherein said stretching means consist of at least one stretching lever (**7, 40, 41**) with at least two cable nipples (**24, 25**) each pivoted by means of a crosspin (**26**) on said stretching lever (**7**) and pro-

vided with a diametral hole (34) through which the cable (8, 9) is passed, the cable ends being each anchored to a tapped



socket (29, 30) movable along the cable and reacting against said nipple.

4,706,394

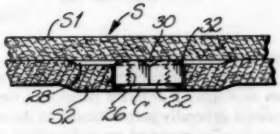
GOLF SPIKE HOLDER

Stanley J. Regula, 823 La Jolla Ave., Sun City Center, Fla. 33570

Continuation-in-part of Ser. No. 713,345, Mar. 18, 1985, abandoned. This application Dec. 10, 1986, Ser. No. 939,963

Int. Cl.[4] A43B *5/00*; A43C *15/00*

U.S. Cl. 36—67 D 8 Claims



1. A replaceable retention system for mounting spikes, cleats and the like thereto in the sole of a shoe comprising:

an elongated transverse plate:

a holder adapted to be insertable into a prepared cavity in the shoe sole;

said holder having an interior threaded portion adapted to threadably receive the threaded shank of the spike;

said holder also structured to receive and support said transverse plate in a laterally slidable orientation perpendicular to said interior threaded portion whereby the spike retains said transverse plate in a particular lateral position with respect to said holder when the spike threaded portion is engaged and tightened in said holder.

4,706,395

BALLAST DRESSING UNIT ON MACHINES WHICH DRESS AND RE-DISTRIBUTE RAILWAY ROAD BED BALLAST

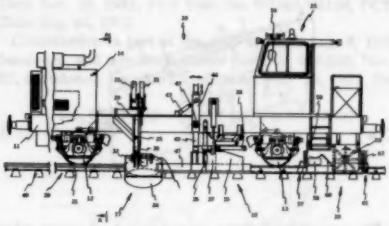
Ivo Cicin-Sain, Bussigny-Laus., Switzerland, assignor to Danieli & C. Officine Meccaniche SpA and ITI/CLM Impianti Technici Industriali SpA, both of Buttrio, Italy

Filed May 22, 1985, Ser. No. 736,771

Claims priority, application Italy, Jun. 7, 1984, 83363 A/84

Int. Cl.[4] E02F *5/22*

U.S. Cl. 37—105 7 Claims



1. A machine for dressing and distributing railway road bed ballast, comprising

a frame having forward and rear ends;

wheels for supporting the frame and engaging rails of a railway;

a dressing unit located near the front end of the frame, comprising:

first and second support arms extending laterally from opposite ends of the frame, vertically adjustable with respect to the frame, each arm extending a variable distance outwardly from the frame; and

first and second rotary lateral dressing drums pivotably secured to the first and second support arms for shaping ballast at the sides of a railway, said dressing drums comprising rotatably mounted blades, said blades comprising engaging means, the drums comprising means cooperating with the engaging means to allow the blades to take one of two distinct positions depending on the direction of rotation of the drums;

a redistributing unit located rearwardly of the dressing unit, comprising:

third and fourth support arms extending laterally from opposite sides of the frame, vertically adjustable with respect to the frame;

first and second ploughs pivotably secured to the third and fourth support arms, said ploughs being pivotable in a horizontal direction;

a drum support, tiltable in a longitudinal direction with respect to the frame;

a transfer drum carried by said support, said transfer drum being vertically adjustable with respect to the frame, oriented to have a vertical axis which is tiltable with the drum support, and disposed beneath the frame and between the first and second ploughs; and

bridge elements for overlying rails of a railway to facilitate transfer of ballast over the rails; and

a brush unit located rearwardly of the redistributing unit, comprising:

a central cleaning unit vertically adjustably secured to the frame, disposed beneath the frame;

a rotary brush for engaging material thrown up by the central cleaning unit, said rotary brush having a substantially horizontal axis; and

a chute means for collecting material engaged by the rotary brush.

4,706,396
FILE

Tetsuro Nomura, Osaka, Japan, assignor to Sanki Vinyl Kabushiki Kaisha, Osaka, Japan

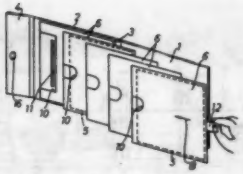
PCT No. PCT/JP85/00142, § 371 Date Nov. 4, 1985, § 102(e) Date Nov. 4, 1985, PCT Pub. No. WO85/04373, PCT Pub. Date Oct. 10, 1985

PCT Filed Mar. 22, 1985, Ser. No. 798,250

Claims priority, application Japan, Mar. 24, 1984, 59-42487; Jul. 13, 1984, 59-106599

Int. Cl.[4] G09F 1/10

U.S. Cl. 40—124.2 **7 Claims**



1. A file comprising a front cover and a back cover which are connected unfoldably with a backbone; also comprising therebetween a plurality of bags, made of plastic having retentionability of its own shape, comprising a front sheet and a back sheet which are welded at respective three sides to form an opening section at a remaining side for sheet-like articles to be put in or out of the bags, said plurality of bags being adapted to stack with their sides aligned vertically, upon closing the front and back covers;

wherein the lowest bag in the stack is combined with its back sheet on the back cover of the file and adjacent bags in the stack are connected to one another by rectangular connecting sheets, made of flexible soft plastic in such a manner that a rectangular connecting sheet is welded with its one side on a back sheet of an upper bag in proximity of the upper bag opening section while the rectangular connecting sheet is welded with the other side on a front sheet of a lower bag with an approximate length of rectangular connecting sheet away from the opening section and wherein a knob is provided on the uppermost bag at its side opposite to the opening section for pulling the bags thus connected out in a direction opposite to the opening section such that the folded bags extend in tiers whereby opening sections of the lower bags are exposed and the opening sections of the front sheets of respective bags are provided with notched parts.

4,706,397
PICTURE FRAME

Walter Hesener, 66, rue de la Prulay, 1217 Meyrin-Geneva, Switzerland

Filed Oct. 30, 1985, Ser. No. 793,104

Claims priority, application Switzerland, Nov. 5, 1984, 5282/84; Nov. 12, 1984, 5398/84; Jan. 15, 1985, 162/85

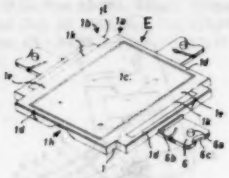
Int. Cl.[4] A47G 1/06

U.S. Cl. 40—152 **21 Claims**

1. A picture frame comprising

a front frame member for enclosing at least one picture window,

a back-plate secured against said front frame member to hold a picture to be placed behind the window, said front frame member including two rectangular frames identical in area and shape, and crossing each other symmetrically in the form of a cross, with the picture window bordered on at least two parallel sides by a longitudinal element of one of said two rectangular frames extending beyond an end region of the other of said two rectangular frames, and the longitudinal elements of said one rectangular frame being



wider than its transverse elements which interconnect the longitudinal elements.

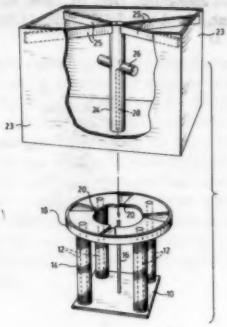
4,706,398
MULTICOLOR INDICATOR WITH ARCUATE POLE PIECES

John Browne, Georgetown, and Matthew Dennis, Mississauga, both of Canada, assignors to NEI Canada Limited, Toronto, Canada

Filed Mar. 3, 1986, Ser. No. 835,178

Int. Cl.[4] G09F 9/00

U.S. Cl. 40—449 **19 Claims**



1. Display element comprising:

pivotally mounted rotor designed at each of 3 or 4 angular locations to display a different panel in a viewing direction, oriented generally perpendicular to the viewing axis,

a permanent magnet mounted on said rotor to rotate therewith, defining a magnetic axis with its major component perpendicular to the rotational axis,

the poles of said permanent magnet defining a circular locus on rotation about the axis of rotation,

independently magnetizable pairs of pole piece tips of magnetic material adjacent but spaced from each other and together located adjacent the locus of a pole of said magnet at locations spaced by the angle between adjacent locations,

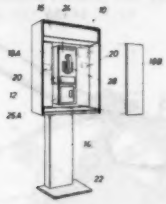
means for magnetizing in the same polarity one tip at a given angular location and a tip at the next angular location in a predetermined direction whereby said pole piece tips as a whole may be magnetized so that at any one time only one of said pairs will be the same and of a given polarity.

4,706,399

APPARATUS FOR MOUNTING AN ADVERTISING DISPLAY UNIT FOR USE WITH A PUBLIC TELEPHONE

R. Craig Martin, Houston, Tex., assignor to JM Industries, Inc., Houston, Tex.

Filed Jan. 24, 1986, Ser. No. 822,208
Int. Cl.[4] G09F *7/00*
U.S. Cl. 40—584 **10 Claims**



1. A vandal resistant mounting apparatus for an advertising display unit adapted for use with a public telephone, the public telephone having a rear housing and a front housing detachably securable to the rear housing, the advertising display unit mounting comprising:

a hollow member having spaced apart front and back walls, the front wall having an opening,

the interior of said hollow member including support means to the rear of the opening in the front wall for securing the rear housing of the telephone,

the advertising display unit including a display wall having an aperture, the display wall of the unit disposed adjacent the front wall of the hollow member with the aperture of the display wall being received about the peripheral configuration of the public telephone rear housing secured to the support means, and

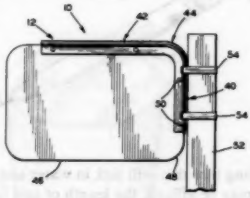
means for preventing removal of the display wall from the hollow member after the front housing of the public telephone is secured to the rear housing of the telephone while allowing removal of the display wall from the hollow member upon detachment of the front housing from the rear housing.

4,706,400

UNIVERSAL SIGN BRACKET

Edward J. Howard, 2567 Broadway, Toledo, Ohio 43609, and Edward J. Howard, Sr., 4244 River Rd., Toledo, Ohio 43614

Filed May 21, 1986, Ser. No. 865,461
Int. Cl.[4] G09F *7/22*
U.S. Cl. 40—617 **17 Claims**



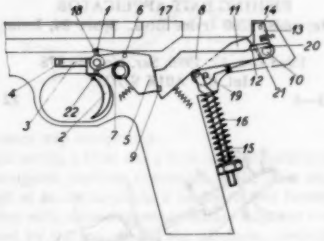
1. A sign bracket adapted to be affixed to supports of different types, including a post of generally U-shaped cross section having a central web and flaring legs, said sign bracket comprising an elongate rigid member of generally T-shaped transverse cross section with a main leg and an intermediate flange extending generally perpendicularly from an intermediate portion of said main leg, said main leg having two spaced, narrow ribs along edge portions on the side opposite said intermediate flange, said ribs being mirror images as viewed from an end of the bracket, said ribs having inner surfaces facing one another which are spaced apart a distance not less than the width of the central web, and said ribs having outer surfaces facing away from one another which are spaced apart a distance not exceeding the distance between outer edges of said flaring legs.

4,706,401

TRIGGER MECHANISM FOR A WEAPON

Bent A. Nielsen, Tyrolsgade 1, 2300 Copenhagen, Denmark

PCT No. PCT/DK82/00020, § 371 Date Nov. 10, 1982, § 102(e) Date Nov. 10, 1982, PCT Pub. No. WO82/03120, PCT Pub. Date Sep. 16, 1982
Continuation-in-part of Ser. No. 763,888, Aug. 8, 1985, abandoned, and a continuation of Ser. No. 444,510, Nov. 10, 1982, abandoned. This PCT application Mar. 10, 1982, Ser. No. 870,292
Int. Cl.[4] F41D *11/02*; F41C *19/00, 17/00*
U.S. Cl. 42—69.03 **4 Claims**



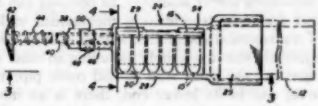
1. A trigger mechanism for a pistol with a trigger, which, when actuated, releases a spring-loaded hammer, characterized in that the mechanism comprises a lever actuated by the trigger, said trigger mechanism comprising a trigger secured to a trigger arm the front of which is mounted pivotally on an axle and a projection which can engage with a disconnector being pivotally mounted on the front end of a gripper, when a stud on the disconnector is extending upwardly in a vertical position, turning the gripper clockwise around a pivot mounting higher than the fulcrum of the disconnector, said lever being pivotally mounted on (the) an upper part and at the rear end of the pistol, and fixedly connected to a rotatable axle having a notch which can engage with a projection on a hammer retainer, said retainer being pivotally mounted at its upper end on an axle, and having a projection which can engage with a recess in an outer side of the hammer.

4,706,402

CARTRIDGE LOADING DEVICE

Frank Csongor, 15 Morgan St., Wenham, Mass. 01984

Continuation-in-part of Ser. No. 568,379, Jan. 5, 1984, Pat. No. 4,574,511. This application Feb. 7, 1986, Ser. No. 827,019
Int. Cl.[4] F42B *39/06*
U.S. Cl. 42—87 **21 Claims**

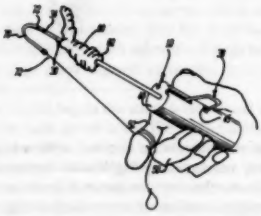


1. Apparatus for rapid loading of a plurality of rounds of ammunition into a magazine, comprising:

a housing having an open end to be received by the magazine and positioned relative to the magazine to enable

passage of the ammunition from the housing into the magazine,
said housing having a receiving port into which the ammunition is disposed;
said housing having means for limiting the position of the ammunition so as to align the ammunition with the magazine,
means supported at the housing remote from the open end thereof for contacting and driving the ammunition through the open end of the housing into the magazine,
support means for the plurality of rounds of ammunition,
said support means and ammunition being loaded into the receiving port of the housing,
said support means and housing inter-engaging guide means for guidance of said support means as it is loaded into the receiving port of the housing,
one of said support means and housing having a slot and the other of support means and housing having a ridge.

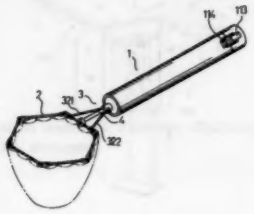
4,706,403
FISHING BAIT APPLICATOR
John L. Reynolds, 5200 Irvine Blvd., Space 84, Irvine, Calif. 92714
Filed Dec. 12, 1986, Ser. No. 940,978
Int. Cl.[4] A01K *97/00*
U.S. Cl. 43—4 **12 Claims**



1. A fishing bait threader comprising:
a. a handle; and
b. an awl dependent from said handle and comprising:
(1) a first large diameter needle with a pointed end;
(2) a second small diameter needle with a pointed end and telescoping received within said first large diameter needle;
(3) first and second fishing hook receptacles distally carried on said first and second needles, respectively; and
(4) first and second leader attachment means also distally carried on said first and second needles, respectively.

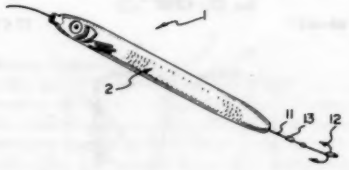
4,706,404
OPENING AND RECOVERING TYPE NET DEVICE
Chang C. Kun, No. 3 Alley La Lane 136, Mang Ping St., Pan Chiao City, Taipei Hsien, Taiwan, R.O.C., Taiwan
Filed Jul. 14, 1986, Ser. No. 885,598
Int. Cl.[4] A01K *77/00*
U.S. Cl. 43—12 **1 Claim**

1. An opening and recovering type net device comprising mainly an adjustable sleeve assembly, an opening and recovering type net frame, a transmission mechanism including a plurality of transmission assemblies, a driving shaft, and a net; and said adjustable sleeve assembly including an outer pipe and an inner pipe; and the inner wall of said outer pipe having a spiral groove; and in its lower end, there is an inner ring-shaped groove so as to be fitted on a key in an opposing position of the inner pipe; and the inner pipe having a long narrow groove for the passing of a stud of a third transmission assembly and embedding in the spiral groove of the outer pipe; and said transmission mechanism including a first transmission assembly, a second transmission assembly, and a third transmission assembly, which are respectively disposed on the driving shaft; and said second transmission assembly being formed into a double cascade shape; and at the both sides of the second transmission assembly, there are grooves for the fixation of connecting rods, and each other end of the connecting rod is aligned with a casing arm of a short frame rod of the net frame; and at the both opposite sides of the first transmission assembly, there are also open grooves for the insertion and fixation of



the short frame rods of the net frame which is assembled with frame rods and joints; and by means of turning a rotation head at the bottom of said inner pipe of the adjustable sleeve assembly, the three transmission assemblies and said driving shaft can rise or descend simultaneously, at the same time, the drive the opening and recovering type net frame to expand for usage or to close for recovering into the adjustable sleeve assembly for the convenience of carrying.

4,706,405
FISH LURE
Douglas Field, P.O. Box 3005, Courtenay, British Columbia, Canada V9N 5N3
Filed May 28, 1985, Ser. No. 738,486
Claims priority, application Canada, Feb. 8, 1985, 473834
Int. Cl.[4] A01K *85/00*
U.S. Cl. 43—42.05 **6 Claims**



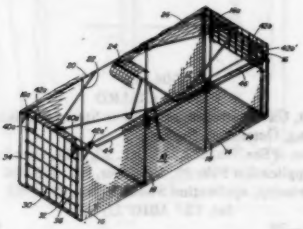
1. A fishing lure that will sink in water and to which a hook apparatus may be affixed, the length of said lure is at least five times its depth, said depth is about two to three times its thickness, the major portion of each of the sides are generally in the same plane, the planes being generally parallel to each other, and the top and bottom edges are, in side view, generally straight or very slightly curved through most of the length of the lure and generally symmetrical along the longitudinal central axis, said lure including a bore extending from a front end to the rear end, which bore is adapted to receive a fishing line or leader in such a manner as to permit the lure to slide freely along a portion of the line or leader.

4,706,406

ANIMAL TRAP

Harry C. Mowatt, R.R. #3, Truro, Greenfield, Colchester County, Nova Scotia, Canada B2N 5B2; Alfred T. MacDonnell, R.R. #1, Elmsdale, Hants County, Nova Scotia, Canada B0N 1M0, and George T. Clark, R.R. #3, Brookfield, Colchester County, Nova Scotia, Canada B0N 1C0

Filed Jun. 11, 1986, Ser. No. 873,733
Claims priority, application Canada, Jun. 19, 1985, 484551
Int. Cl.[4] A01M *23/16*
U.S. Cl. 43—61 6 Claims



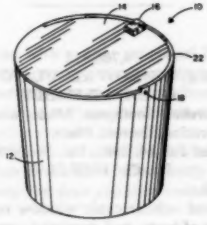
1. A trap for animals comprising a cage having a bottom, side walls and a top and closure means at its opposite ends, at least one end closure means being in the form of a flexible drop gate including horizontal bars slidable on vertical guide rods and spacer means connected between said bars to regulate their spacing, and having latch means for holding the drop gate normally raised, tripper means within the cage being connected to said latch means to allow the gate to drop when an animal has entered the cage and touched the tripper means, and wherein a lock mechanism is provided which prevents lifting of the gate by an animal trapped in the cage, said lock mechanism including an apertured element sliding on a guide rod, said element being slidable up the guide rod when lifted by hand but having an off-set connection to the gate such that jamming occurs if an attempt is made to raise the gate without also raising the element.

4,706,407

ANIMAL TRAP

Melvin M. Melton, 511 Avenida Del Mar, No. C, San Clemente, Calif. 92672

Continuation of Ser. No. 784,535, Oct. 4, 1985. This application Jul. 2, 1986, Ser. No. 881,909
Int. Cl.[4] A01M *23/04, 1/10*
U.S. Cl. 43—69 1 Claim



1. An animal trap especially suited for catching insects and comprising:

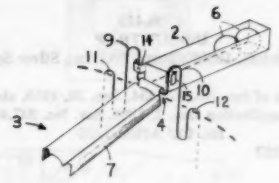
a fully enclosed container having a top surface, a portion of said top surface having a slot exposing the trigger side of an elongated swinging door, said door having a non-trigger side that is marginally heavier than said trigger side, said trigger side and said non-trigger side being obtusely angled relative to one another and being integral to one another at a fulcrum positioned beneath said top surface, whereby the weight of an insect on said trigger side rotates said swinging door until said non-trigger side engages said top surface.

4,706,408

MARBLES COUNTER WEIGHTED REPEATING MOUSE TRAP

George K. Mellard, 43 Pineview Ave. B18, Cardiff, N.J. 08232

Filed Apr. 7, 1987, Ser. No. 35,467
Int. Cl.[4] A01M *23/04*
U.S. Cl. 43—69 16 Claims



1. A rodent trap comprising:

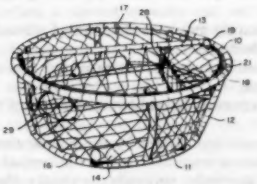
a trough having a front and a back end for holding marbles; an elongated platform connected to the front end of the trough at an obtuse angle; a wire structure having a supporting wire; mounting means affixed adjacent to an apex formed by the trough and the platform, removably and pivotally mounted on said supporting wire; said marbles being initially disposed at the back end of the trough, thus tilting the trough backward and said marbles being actuated by the weight of the rodent on the platform to roll forward to the front end of the trough, thereby accelerating the platform to rapidly tilt forward and down.

4,706,409

CRAB POT CONSTRUCTION

Edgar W. Downing, P.O. Box 903, Bodega Bay, Calif. 94923

Filed Jun. 9, 1986, Ser. No. 872,273
Int. Cl.[4] A01K *69/08*
U.S. Cl. 43—102 1 Claim



1. In a crab pot construction, upper and lower circular frame members, a plurality of upright frame members connected to and disposed between said upper and lower frame members so that the upper and lower frame members are in a vertically spaced generally parallel relationship, a cross frame member extending across the upper member and secured thereto, means forming a closure which includes a substantially semi-circular rod hingedly mounted on said cross frame member and being adapted to extend over the space between the cross frame member and one side of the upper frame member, yieldable spring latch means carried by at least one of the upright members and adapted to engage the rod to hold the rod in a position which is generally planar to the plane in which the upper frame member lies to provide an openable closure for the crab pot for

access to the interior of the crab pot, said yieldable spring latch means being comprised of an elongated spring-like member secured at its lower end to one of the upright frame members and extending vertically upwardly from the secured lower end, said spring latch means having a notch formed near its upper end disposed interiorally of the upper circular frame member and facing in a direction exteriorally of the upper frame member, said notch being adapted to receive said semi-circular rod to retain said closure in a closed position, means carried by the yieldable spring latch means adapted to be engaged by the hand whereby the spring latch means can be moved to release said semi-circular rod to permit said closure to be swung upwardly to an open position and netting extending over the upper and lower circular members and the upright members and the closure.

4,706,410

INSECT TRAP

Michael W. Briese, 10308 Cherry Tree La., Silver Spring, Md. 20901

Continuation of Ser. No. 876,434, Jun. 20, 1986, abandoned. This application Dec. 2, 1986, Ser. No. 937,458

Int. Cl.[4] A01M *1/10*

U.S. Cl. 43—107 **8 Claims**

1. An insect trap comprising:

A. a substantially conical shell with a central axis, said shell having:

a downwardly and inwardly tapered sidewall with a top and a bottom,

an upstanding annular rim provided at the top of the sidewall,

a lower opening defined by the bottom of the side wall, and

an upper portion defined by the annular rim;

B. baffle means positioned within the conical shell and extending generally vertically upwardly therefrom, said baffle means comprising a plurality of fins which extend generally radially outwardly from the central axis of the shell and a plurality of baffle spaces being defined by and between adajacent fins, each of said fins having:

an upper edge located above the annular rim,

a lower edge located within the conical shell below the annular rim,

an outer edge having a substantially vertical upper portion in contact with an inner surface of the annular rim and extending upwardly above the annular rim, and an inclined lower portion in contact with the inner surface of the sidewall of the conical shell, and

an upwardly extending slot formed therein below the upper edge of the fin and extending above the annular rim of the conical shell,

wherein the slots in the fins are substantially horizontally aligned,

C. substantially flat first insect lures extending through the slots in adjacent fins such that a portion of at least one of said flat insect lures is located in each of the baffle spaces of the baffle means;

D. an insect receptacle having an open top in which the bottom of the conical shell is received such that the lower opening of the conical shell is located below the open top of the insect receptacle; and

E. means for removably securing the insect receptacle to the conical shell.

4,706,411

PLANT GUARD

Bo Lövqvist, Gävle, Sweden, assignor to Strumpfabriken Vinetta Aktiebolag, Östersund, Sweden

Continuation of Ser. No. 572,934, Jan. 20, 1984, abandoned. This application Feb. 20, 1986, Ser. No. 833,506

Claims priority, application Sweden, Jan. 21, 1983, 8300313

Int. Cl.[4] A01G *13/10*

U.S. Cl. 47—30 **20 Claims**

1. A plurality of plant guards attached together in a sequence, said plant guards being adapted to protect a plant when planted in the ground against attack by pests, each plant guard comprising:

a knitted hose-shaped net structure adapted to form a protective casing around the plant when expanded, said hose-shaped net structure having a lower portion for enclosing at least a portion of the root structure of the plant and an upper portion for enclosing at least a portion of the remainder of the plant;

said lower portion having a terminal end opening; and engaging means having at least one thread for spanning said terminal end opening and integral with said lower portion for engaging the root structure of the plant.

4,706,412

VEHICLE CABLE WINDOW REGULATOR AND SLIDER GUIDE ASSEMBLY

Michael D. Kobrehel, Southgate, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 14, 1986, Ser. No. 885,285

Int. Cl.[4] E05F *11/48*

U.S. Cl. 49—352 **5 Claims**

1. An improved vehicle cable window regulator having a reduced number of parts, said regulator comprising in combination:

a reversible rotatable drum;

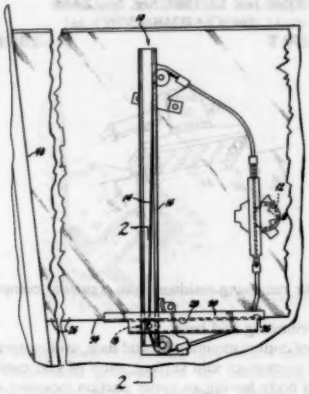
a single cable having both ends affixed with said drum;

a channel means providing a fixed path;

a guide slidably mounted in said channel means in said path, said guide providing a curvilinear groove for an intermediate portion of said cable;

a pin transversely projecting through said guide adjacent said groove;

means for attaching said pin to said window; and



a washer, surrounding said pin and mated with said guide trapping said cable in said groove whereby said cable is nondeformably secured to said guide.

4,706,413

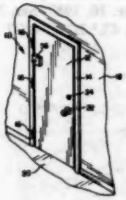
SMOKE DETECTOR-ACTIVATED DOOR SEAL

Kenneth S. James, 4169 E. 188th St., Cleveland, Ohio 44122

Filed Oct. 16, 1986, Ser. No. 919,441

Int. Cl.[4] E05F *15/20*

U.S. Cl. 49—477 **8 Claims**



1. A seal for use with a door supported by a frame and movable relative thereto, the seal comprising:

an extensible member secured to, and disposed about, the periphery of the door, the extensible member being in the form of a bladder movable between a retracted position in which the door can be opened and closed, and an extended position in which a substantially airtight seal is formed between the door and the surrounding frame and floor; and

means for selectively inflating the bladder to its extended position, the means for inflating the bladder including a sensor in the form of a smoke detector for detecting the presence of smoke, a source of compressed air operatively connected to the bladder, the source of compressed air being mounted to the door, and a control for the source of compressed air, the control being activated by the sensor upon the sensor sensing the presence of smoke.

4,706,414

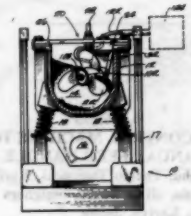
APPARATUS FOR ROTATABLY SUPPORTING A MARINE PROPELLER IN A VIBRATING MEDIA

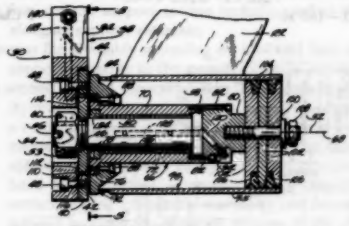
Gregory A. Muzik, Shawano, Wis., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed May 28, 1985, Ser. No. 737,933

Int. Cl.[4] B24B *19/00*

U.S. Cl. 51—7 **26 Claims**





25. An apparatus adapted to rotatably support a propeller in a vibrating media, the propeller including a tubular hub having an annular end surface, and an inner surface with an inner diameter, said apparatus comprising a mounting bracket including a generally planar surface having an annular groove, an axle member fixedly connected to said mounting bracket and having a longitudinal axis and an outer surface, slot and key means operative between said axle member and said mounting bracket for preventing rotation of said axle member relative to said mounting bracket, a hub member including a first end having a generally planar surface adjacent said mounting bracket surface, a second opposite end, an inner surface defining a generally cylindrical bore receiving said axle member such that said hub member rotates relative to said mounting bracket about said axle member, and an annular surface perpendicular to and centered on said axle member axis, means releasably and fixedly connecting the propeller hub to said hub member with the annular end surface of the propeller hub engaging said annular surface of said hub member for enabling rotation of the propeller with said hub member relative to said mounting bracket, said connecting means including an externally threaded projection extending from said second end of said hub member along said axle member axis, a pair of discs having diameters slightly less than the inner diameter of the propeller hub inner surface and including central apertures slidably receiving said projection, and radially outer portions including outer edges, an annular, resilient, flexible member positioned between said outer portions of said discs, and a nut threaded onto said projection for squeezing together said discs between said nut and said second end of said hub member to cause said flexible member to extend beyond said outer edges of said discs and to engage the inner surface of the propeller hub, sealing means between said hub member inner surface and said axle member outer surface adjacent said mounting bracket, means for providing an air current between said hub member planar surface and said mounting bracket planar sur-

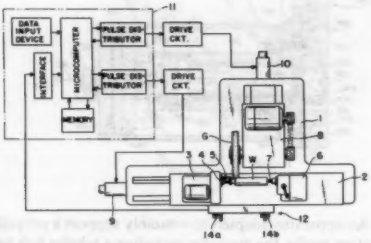
face and including an air passage in said mounting bracket communicating with said groove in said mounting bracket, a bushing located in said cylindrical bore between said hub member inner surface and said axle member outer surface and, means for supplying a lubricant to said outer surface of said axle member.

4,706,415

NUMERICAL CONTROL MACHINE TOOL WITH MANUAL FEED HANDLE

Hiroshi Okada, Ohbu; Toshio Tsujiuchi, Kariya, and Tadashi Ogasawara, Toyoda, all of Japan, assignors to Toyoda Koki Kabushiki Kaisha, Kariya, Japan

Filed Jun. 26, 1986, Ser. No. 878,799
Claims priority, application Japan, Aug. 29, 1985, 60-188601
Int. Cl.[4] B24B *49/00*
U.S. Cl. 51—165 R **7 Claims**



1. A numerical control machine tool having a bed, a workpiece carrier movable on said bed in first horizontal direction, a tool carrier movable on said bed in a second horizontal direction across said first horizontal direction, first and second servomotors for respectively moving said workpiece carrier and said tool carrier on said bed, a numerical controller for controlling the operations of said first and second sermomotors in accordance with a numerical control program, and an operator's panel manually operable for supplying said numerical controller with command signals, said operator's panel comprising:

a main frame of a generally box shape;

pulse generator means fixedly mounted in said main frame and having input shaft means rotatable for generating pulse signals to be input to said numerical controller;

manual feed handle means secured to said input shaft means of said pulse generator means for rotating said input shaft means;

support means provided on a front portion of said bed located at the side which is opposite to said tool carrier through said workpiece carrier therebetween, for supporting said main frame pivotably about an axis extending in and parallel to said first horizontal direction and above and at a 90° angle to said input shaft so that said main frame is pivotable from a home position where said input shaft means of said pulse generator means is horizontally oriented, to any one of tilted positions where said input shaft means of said pulse generator means is oriented inclined upwardly; and

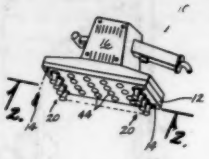
locking means manually operable for fixing said main frame at any one of said home position and said titled positions.

4,706,416

TOOL FOR REMOVING RESIDUES

Robert P. Kottas, 711 North 91st Plaza, #304 Omaha, Nebr. 68114-2645

Filed Jan. 12, 1987, Ser. No. 2,443
Int. Cl.[4] B24B *23/00*
U.S. Cl. 51—170 T **18 Claims**



1. A tool for removing residues from a surface comprising:

a base;

means for vibrating said base;

a plurality of cutters mounted on said base, said cutters being disposed to contact said surface, each of said cutters including a body having an upper portion mounted to said base and a foot portion at the lower end of said cutter, said foot portion including a cutting edge at the perimeter thereof; and

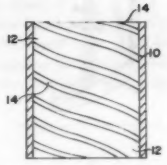
means for adjusting the angle of inclination of said cutters with respect to said base.

4,706,417

FINISH FOR CYLINDER LINERS

Joseph V. Gary, Chagrin Falls, Ohio 44022, assignor to Chromium Corporation, Richardson, Tex.

Continuation of Ser. No. 647,992, Sep. 6, 1984, abandoned. This application Mar. 10, 1987, Ser. No. 22,585
Int. Cl.[4] B24C *1/00*
U.S. Cl. 51—319 **5 Claims**



1. In a method of finishing the inner surface area of a cylinder liner for accommodating a reciprocating piston, comprising the steps of

forming a honed inner surface of a predetermined base porosity and having plateau surfaces, said base porosity being in a range of about 10%–50% and being effective to maintain a film of lubricating oil on the cylinder liner to lubricate said cylinder liner relative to said piston reciprocating therein, and

forming a break-in surface by applying an abrasive medium to said honed surface area

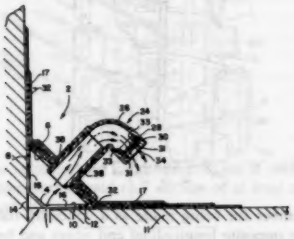
the improvement wherein said break-in surface is formed by blasting said honed surface with from 0.0005 to 0.005 pounds of an abrasive per square inch of surface, said abrasive having a grit size of 60 to 150 mesh.

4,706,418

ROOFING CANT

Victor M. Stewart, Redmond, Wash., assignor to Industrial Research Development, Inc., Kirkland, Wash.

Filed Aug. 26, 1986, Ser. No. 900,321
Int. Cl.[4] E04F 17/04; E02B 11/10
U.S. Cl. 52—58 14 Claims



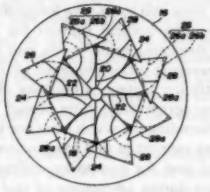
1. A roofing cant comprising tube means having a substantially trapezoidal cross-section for channeling moisture or gases, perforation means for ingress of moisture or gases to the tube means, and venting means for egress of moisture or gases from the tube means.

4,706,419

OPENABLE DOME-SHAPED ROOF STRUCTURE

Toshio Adachi, Yawata; Toru Aoyagi, Tokyo; Akihisa Kawaguchi, Iruma, and Shigeki Yamanaka, Kobe, all of Japan, assignors to Ohbayashi-Gumi, Ltd., Osaka, Japan

PCT No. PCT/JP85/00732, § 371 Date Jun. 25, 1986, § 102(e) Date Jun. 25, 1986, PCT Pub. No. WO86/06123, PCT Pub. Date Oct. 23, 1986
PCT Filed Dec. 28, 1985, Ser. No. 882,976
Claims priority, application Japan, Apr. 9, 1985, 60-73583; Jun. 13, 1985, 60-127089; Nov. 19, 1985, 60-257638
Int. Cl.[4] E04B 1/346
U.S. Cl. 52—65 3 Claims



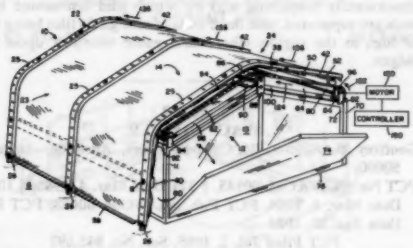
1. An openable dome-shaped roof structure comprising:
a dome-shaped stationary roof section secured at an outer periphery thereof to a side wall;
an opening formed substantially in the central portion of said stationary roof section; and
a plurality of movable roof units each having a shape capable of covering one of a plurality of equal divisions of said opening and pivotably secured at one end thereof to a support located near the circumference of said opening, each of said movable roof units being turned about a respective said support between a first position where said opening is closed and a second position where said opening is opened, said movable roof units being arranged alternately on different levels along the circumferential direction so as to support each other, and said movable roof units all being driven together for simultaneous turning motion about respective said supports.

4,706,420

RETRACTABLE GREENHOUSE CANOPY

Marshall N. Winkler, 146 South St., Rockport, Mass. 01966

Filed Apr. 14, 1986, Ser. No. 851,819
Int. Cl.[4] E04B 7/16; A01G 9/14
U.S. Cl. 52—66 19 Claims



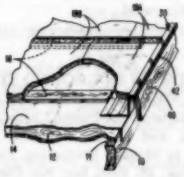
1. A retractable greenhouse canopy apparatus comprising:
a first skeletal support section including a first plurality of elongate support elements;
means for pivotably mounting each of said first plurality of support elements to the ground beside a greenhouse;
a second skeletal support section including a second plurality of elongate support elements, each foldably attached to a respective element of said first plurality of support elements, said first and second support sections being extendable above and at least partly across the greenhouse, insulated blanket means extending across, attached to and retractably and extendably carried by said first and second support sections for covering an area of the greenhouse beneath said first and second support sections, and
reciprocably operable means for selectively folding said second plurality of support elements relative to said first plurality of support elements and pivotably raising said first plurality of support elements to retract said blanket means sufficiently to expose a previously covered region of the greenhouse and means for selectively unfolding said second plurality of support elements relative to said first plurality of support elements and pivotably lowering said first plurality of support elements to extend said blanket means sufficiently to cover a previously exposed region of the greenhouse.

4,706,421

GABLE RAKE STRIP FOR A TILE ROOF

Roger D. Thompson, La Canada, Calif., assignor to Boral (USA) Inc., Los Angeles, Calif.

Filed Jan. 13, 1982, Ser. No. 339,086
Int. Cl.[4] E04D 1/36, 13/00
U.S. Cl. 52—94 4 Claims



1. In a tile roof the type comprising a sheathing, a waterproof underlayment disposed upon the sheathing, a covering of tile disposed atop the underlayment such that nose ends of the tiles rest upon the head ends of the next lower tiles, and a rake strip disposed along a gable edge to cover exposed ends of the

tiles, said rake strip comprising a base portion supported upon said roof and an upstanding portion extending upwardly from an outer side of said base portion, said base portion including a plurality of upstanding ridges disposed parallel to the gable edge, the gable tiles including head ends supported upon said ridges, the upper end of said upstanding portion being reversed downwardly to the outside of said strip, wherein tiles located adjacent said gable tiles include head ends which comprise downwardly projecting legs by which said last-named head ends are supported, said head ends of said gable tiles being free of lugs in the region where said gable tiles rest upon said ridges.

4,706,422

SPACE DIVIDER

Geoffrey B. Ashton, 26 Chesser Street, Adelaide, Australia 50000

PCT No. PCT/AU85/00145, § 371 Date Mar. 4, 1986, § 102(e) Date Mar. 4, 1986, PCT Pub. No. WO86/00658, PCT Pub. Date Jan. 30, 1986

PCT Filed Jul. 2, 1985, Ser. No. 845,697

Claims priority, application Australia, Jul. 6, 1984, PG5875

Int. Cl.[4] E04B *1/82*; E04C *2/34, 2/38*

U.S. Cl. 52—145 **7 Claims**

1. A space divider of generally rectangular shape comprising: a first side wall **(1)** and a second side wall **(8)** spaced apart by inturned end portions **(3,9)** along only two opposite sides which overlap to form two side closures for the panel, a multiplicity of apertures **(2)** in the said side walls, an upper lock member **(11)** and a lower lock member **(12)** engaging the ends of the said side walls **(1–8)** and cooperating with said two side closures to form a perimeter frame around the said side walls, intersecting stiffeners **(4–5)** between said first wall **(1)** and the second wall **(8)** to form cavities **(6)** therebetween, acoustic batts **(7)** in the said cavities whereby to form a rigid acoustic panel, and a fabric cover **(26)** fitting over the said rigid acoustic panel, said fabric cover **(26)** comprising two faces to cover the said first **(1)** and second **(8)** side wall and said faces being joined around three sides of the fabric cover to fit the perimeter frame, whereby the said fabric cover **(26)** has, a sack-like configuration with a mouth **(27)** to permit it to be pulled over the said rigid acoustic panel.

4,706,423

STRUCTURE FOR AN IN-GROUND STORAGE BIN FACILITY, AND METHOD OF MANUFACTURING IT

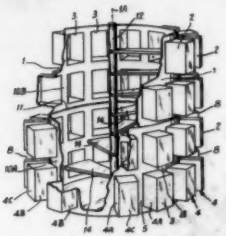
Bernard Carlteau, Sarlat; Jean-Pierre Legros, Domme; André Charrieras, Brive, and Michel Feuvrier, La Pace, all of France, assignors to Mega X Protection, France

Filed Apr. 28, 1986, Ser. No. 856,229

Int. Cl.[4] E02D *27/00*

U.S. Cl. 52—169.7 **9 Claims**

1. A structure for an in-ground storage facility comprising a main wall extending around an incurvated closed perimeter about a longitudinal axis and a plurality of storage bins which project radially outward from said main wall with respective openings in said wall so that at least five walls of said storage bins are in contact with the ground, said bins being spaced apart from one another at least by longitudinally extending gaps, said structure further comprising a one piece strong, flexible member for being made as a generally flat structure having two opposite longitudinal end edges and being subsequently curved to follow said incurvated closed perimeter with said end edges being securely fastened together.



4,706,424

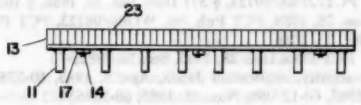
FLOOR MODULE STRUCTURE

Ronald T. Garapick, and Peter J. Garapick, both of 1813 Alvin Ave., Cleveland, Ohio 44109

Filed Apr. 1, 1986, Ser. No. 846,719

Int. Cl.[4] B65D *19/26*

U.S. Cl. 52—181 **6 Claims**



1. A floor module structure, comprising a steel base plate, a plurality of steel longitudinal spaced bars welded to the bottom side of said base plate and extending longitudinally under said base plate to provide vertical support for limiting vertical deflection when sustaining heavy loads, said base plate having a top surface, a wearing surface material affixed to and covering said base plate top surface, a plurality of steel cross bars welded transverse across the bottom of said longitudinal bars at the ends and extending the width from one bar to another for providing holding support of said longitudinal bars in position when assembling and for providing stiffening and limiting vertical deflection during fabricating of said floor module to provide a flat base plate top surface and said cross bars are angle bars.

4,706,425

STAIR UNIT STRUCTURE

Jack J. Brumbalough, P.O. Box 1620, Maryville, Tenn. 37802

Filed May 6, 1986, Ser. No. 860,086

Int. Cl.[4] E04F *11/00*

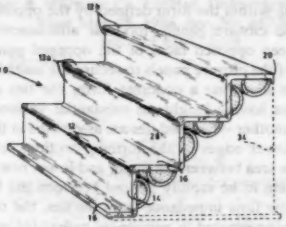
U.S. Cl. 52—182 **16 Claims**

1. A stair unit structure comprising:

at least one integrally formed stair step of a selected length having a riser member and a tread member fabricated from a semirigid material, said riser and tread members defining exposed surfaces and rear surfaces;

a hollow hemitubular reinforcement member defining longitudinal edges secured to said rear surface of at least one of

said tread and riser members along said selected length to provide added strength thereto; and



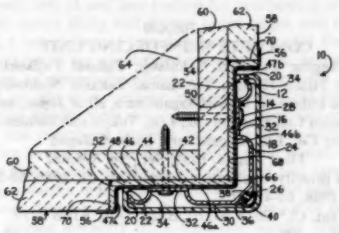
means for securing said longitudinal edges of said reinforcement members to said rear surface of at least one of said riser and said tread members.

4,706,426

FIRE-RATED FLUSH MOUNTED CORNER GUARD

Roger L. Rumsey, Wichita, Kans., assignor to Balco, Inc., Wichita, Kans.

Filed Nov. 28, 1986, Ser. No. 935,797
Int. Cl.[4] E04F *13/06, 19/02*
U.S. Cl. 52—232 **11 Claims**



1. A fire rated guard for covering a junction area presented by adjacent walls, said walls each having an outermost surface and being relieved in the vicinity of said juncture area for defining a recessed area presenting recess-defining wall surfaces for receiving said guard, said fire rated guard comprising:

a cover configured to substantially cover said recessed area;

means for mounting said cover in covering relationship to said recessed area;

heat insulating and protective means interposed within said recessed area and behind said cover for resisting the effects of heat and increasing the fire rating of said walls in the vicinity of said juncture area,

said heat insulating and protective means comprising a thin metallic protector plate disposed in proximal, face-to-face relationship with said recess-defining wall surfaces for cooperatively defining between the recess-defining wall surfaces and said plate a continuous, thin, insulation-receiving channel, said protector plate being formed of metallic material capable of withstanding exposure to a flame of 1800° F. for two hours such that, after the two hour flame exposure, the protector plate will not pass water from a fire hose stream directed thereagainst,

said insulating and protective means further comprising a thin sheet of thermal insulating material situated within said insulating-receiving channel and remote from said mounting means and cover,

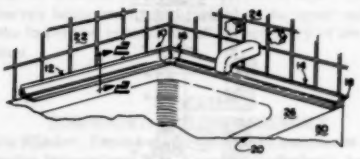
the combined thickness of said insulating material and plate being substantially less than the depth of said recessed area whereby said guard will essentially fit within the recessed area to give a smooth, aesthetic appearance to said juncture area.

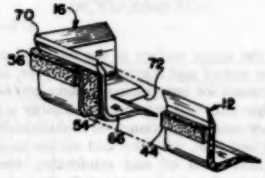
4,706,427

SEALING SYSTEM

Alan Zeilinger, Cleveland, Ohio, assignor to Magic American Chemical Corporation, Cleveland, Ohio

Filed Sep. 15, 1986, Ser. No. 907,030
Int. Cl.[4] E04H *1/00*
U.S. Cl. 52—288 **24 Claims**





1. A sealing system for sealing the junction between a horizontal surface such as the top surface of a bathtub, counter top or sink and two adjacent vertical surfaces, the vertical surfaces and horizontal surface being substantially mutually perpendicular and defining two longitudinal joints, one vertical joint and a corner at the intersection of the joints,

said system comprising two generally L-shaped sealing strips each with a pair of legs extending lengthwise parallel to a respective one of the longitudinal joints and each stopping a predetermined distance short of the corner, and

a one-piece corner piece having three generally planar, orthogonally intersecting walls of substantially uniform thickness respectively adjacent the horizontal and vertical surfaces, said walls being shorter than the predetermined distance, and two flanges extending longitudinally beyond the ends of said walls, said flanges having front sides forming a continuation of the front sides of said walls and having a thickness from the front sides of said flanges less than the thickness of said walls for receipt of said sealing strips behind said flanges, each of said flanges overlapping with the one of the L-shaped sealing strips.

4,706,428

APPARATUS FOR REINFORCING A CONCRETE BLOCK WALL

Donald M. McCoy, 10016 N. Krikland Ct., and James M. McCoy, 11249 N. Oriole Ln., both of Mequon, Wis. 53092

Filed Oct. 17, 1986, Ser. No. 920,523
Int. Cl.[4] E04B *2/16;* **E02D** *27/00*
U.S. Cl. 52—293 **8 Claims**

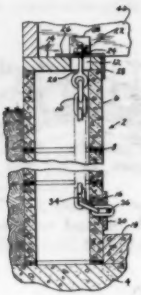
1. In a block wall erected on a foundation and being formed of consecutive courses of blocks having vertical passages therein formed by vertical side walls in the concrete block, so that the blocks cooperate to form a series of generally vertical passages in the wall, an apparatus for reinforcing said wall, comprising:

an elongated reinforcing member for placement within at

least one of the vertical passages of the wall, said reinforcing member having an upper end and a lower end;

anchor means for anchoring said lower end of said reinforcing member, said anchor means being disposed exteriorly of a face of the wall at a point adjacent the bottom of the wall above the top of the foundation independent of any connection to the foundation;

retainer means for maintaining said upper end of said reinforcing member in position, said retainer means being



adjacent the upper surface of the wall and connected to said upper end of said reinforcing member; and

tensioning means for introducing tension into said reinforcing member after said reinforcing member is anchored to said anchor means and connected to said retainer means to reinforce said wall, whereby said anchor means prevents upward movement of said reinforcing member when tension is introduced into said reinforcing member by use of said tensioning means, independent of any connection of said reinforcing member to the foundation.

4,706,429

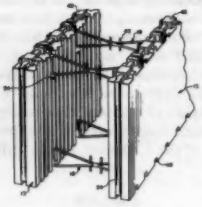
PERMANENT NON-REMOVABLE INSULATING TYPE CONCRETE WALL FORMING STRUCTURE

David A. Young, Glen Ellyn, Ill., assignor to Young Rubber Company, Naperville, Ill.

Filed Nov. 20, 1985, Ser. No. 799,932

Int. Cl.[4] E04B *2/00*

U.S. Cl. 52—309.12 **33 Claims**



1. In a modular synthetic plastic concrete form structure, wherein the improvement comprises a pair of modular concrete impervious forming panels comprised of a series of opposed modular concrete forming sections stacked on top on one another and also disposed in end-to-end relation, the sections each having means on its upper and lower edges and its opposite vertical edges for interlocking the sections in engagement with one another, the panels being positioned in spaced opposed relation, tie slots in the opposed sections positioned in longitudinally spaced rows along the upper and lower edges, synthetic plastic ties arranged in vertically spaced rows along upper and lower edges of the sections, the ties being positioned in vertically spaced horizontally extending rows and the ties having opposite enlarged tie ends retainingly engaged in said tie slots securing the sections in opposed spaced relation, modular transversely extending closure panels mounted between the opposed panels providing end closures for confining poured concrete within the form defined by the opposed panels and the end closure panels, modular attachment means provided between opposed faces of the opposed panels and opposite ends of the closure panels to secure the assemblage in unitary relation to define a concrete form, the ties and the forming sections having heights at substantial variance with respect to one another when said ties are assembled in the rows at upper and lower edges of the forming sections leaving a substantial open area between the upper and lower rows of ties enabling concrete to be rapidly poured between the forming sections with low flow impedance from the ties, the reinforcing ties each being secured in permanent embedded assembly at opposite ends with the synthetic plastic opposed panels and also with the concrete when poured and hardened in the thus provided form to provide an insulated concrete wall with the synthetic plastic panels permanently attached to the exterior of the concrete wall.

4,706,430

CONCRETE REINFORCING UNIT

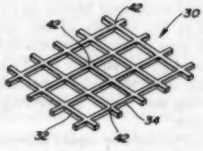
Minoru Sugita; Teruyuki Nakatsuji; Tadashi Fujisaki, all of Tokyo; Hisao Hiraga, Yokohama; Takashi Nishimoto, and Minoru Futagawa, both of Sagamihara, all of Japan, assignors to Shimizu Construction Co., Ltd., Tokyo and Dainihon Glass Industry Co., Ltd., Sagamihara, both of, Japan

Filed Aug. 8, 1986, Ser. No. 894,832

Claims priority, application Japan, Dec. 26, 1985, 60-295751; Feb. 26, 1986, 61-41197

Int. Cl.[4] E04F *15/10*; B32B *3/10*; F16B *2/14*

U.S. Cl. 52—309.16 **18 Claims**



1. A concrete reinforcing unit adapted to be embedded in concrete for concrete construction, said concrete reinforcing unit comprising:

(a) first parallel reinforcement elements;

(b) second parallel reinforcement elements crossing said first parallel reinforcement elements at first crossing portions, each of said first reinforcement elements and said second reinforcement elements including at least one row of first textiles and a first resin matrix, made of a first resin, for bonding said first textiles thereof; and

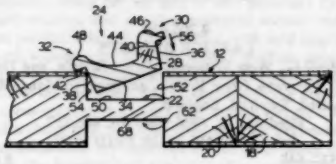
(c) attaching means for attaching said first reinforcement elements and said second reinforcement elements at corresponding first crossing portions to form a grid member having a peripheral portion, said attaching means comprising said first resin, said first and second reinforcing elements being impregnated with said first resin before attachment thereof.

4,706,431

RECESSED DECORATIVE MOULDING FOR WOOD PANEL

Vincent Corvese, Thornhill, Canada, assignor to Oakwood Lymber & Millwork Co. Limited, Downsview, Canada

Filed May 28, 1986, Ser. No. 867,806
Int. Cl.[4] E04C 2/38
U.S. Cl. 52—313 **1 Claim**



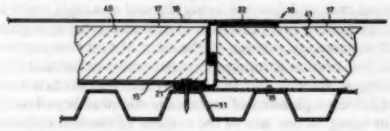
1. A slab door of standard dimensions comprising a composite having a front surface of veneer laminated to a solid core, a moulding recessed in said composite slab to define a decorative panel design, a groove being provided in said slab of an outline which defines said moulding border, said groove being generally rectangular in cross-section as formed in said core and extending through said veneer, said groove having wall portions which define said rectangular shaped groove with said wall portions terminating at said veneer to define upper parallel edges of said groove, said moulding having a base portion for fitment into said groove and a flange portion extending along each side of said base portion for overlapping and covering said veneer along said groove upper edges, said moulding having a recess formed into said base below said flange portions and below a plane defined by said veneer, said moulding base has an essentially planar lower surface with first and second upright sides merging into respective said flange portions, said upright sides sloping inwardly from said respective flange and coverging towards said base lower surface, said moulding having an inner flange and an outer flange, said first upright side of said moulding base adjacent said inner flange sloping inwardly more than said second upright side adjacent said inner flange to permit thereby positioning of said inner flange sloping inwardly more than said second upright side adjacent said inner flange to permit thereby positioning of said inner flange against one upper edge of said groove and pivoting said moulding to lower said outer flange onto the other upper edge of said groove and place said base portion in said groove, and glue as applied o said moulding base lower surface and said first and second upright sides, affixing said moulding base to said groove wall portions.

4,706,432

AIR VAPOR SECUREMENT CLOSURE FOR A MEMBRANE ROOFING SYSTEM

Douglas C. Fishburn, Hornby, Canada, assignor to Fishburn Roofing Sciences Group Limited, Hornby, Canada

Filed Feb. 18, 1986, Ser. No. 830,353
Int. Cl.[4] E04D 1/28
U.S. Cl. 52—404 **19 Claims**



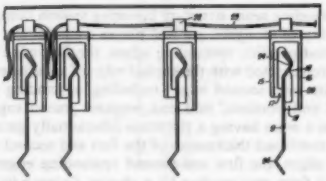
1. A roof structure for a building, comprising:
a layer of insulation overlying a roof deck and being secured thereto;
a membrane overlying the insulation layer;
a lower seal of rigid construction being fastened to the deck and underlying the layer of insulation abouts it periphery at a lower edge thereof; and
an upper seal member having a first portion overlying the layer of insulation about its periphery at an upper edge thereof being above said lower edge, said first portion being sealingly affixed to the membrane, and the upper member having a second portion extending downwardly along an upright side of the insulation and being continuously affixed to the lower seal member about the periphery of the insulation, the upper and lower seal members coacting with the membrane to provide a sealed closure about the periphery of the roof structure and a vapor barrier between the deck and insulation layer, the vapor barrier being continuously sealed to the upper surface of the lower seal member about the periphery of the insulation.

4,706,433

SUSPENDED CEILING ASSEMBLY

Willem Rijnders, Papendrecht, Netherlands, assignor to Hunter Douglas International N.V., Curacao, Netherlands Antilles

Filed Oct. 7, 1985, Ser. No. 785,316
Claims priority, application United Kingdom, Dec. 6, 1984, 8430813
Int. Cl.[4] E06B 9/26
U.S. Cl. 52—473 **8 Claims**



1. A suspended ceiling assembly comprising, a number of elongate panels, two parallelly arranged fixed support beams (8) having a longitudinally axis, panel supporting members (14) supported by said beams and displaceable therealong, said panel supporting members having panel holding means (15 and 20) cooperating withthe panels (9) to hold the panels with their longitudinal axes at an angle to the longitudinal axes of the beams, the supporting members (14), which are supported by at least one of the beams, having positioning means for positioning and holding the supporting members at preselected mutual distances along the beam length, the positioning means being capable of being deactivated to allow displacement of the supporting members, with the panels carried thereby, along the beams, to remove the panels from a certain ceiling area, characterised in that the supporting members (14) and said elongate panels (9) supported thereby are arranged in a group (25, 26, 27) and in that the positioning means comprise distance members (29, 30, 34) which interconnect the supporting members or the panels of the group supported thereby in a manner to allow a preselected maximum mutual spacing between the panels of the group and unhindered closing of the mutual spacings upon displacement of said panels and their supporting members along said two support beams, in a direction to remove panels from said certain ceiling area, at least one supporting member of a first end panel of the group, cooperating with a locating means on its beam and a locking means to releasably lock the position of said first end panel supporting member with respect to its beam and at least one further supporting member of the other end panel of the group, cooperating with a locating means on its beam and a fixing means for holding the other end panel supporting member in a predetermined position with respect to its beam, said locking means and fixing means each comprising a separate clip engageable with said locating means, said clip having a surface engageable by

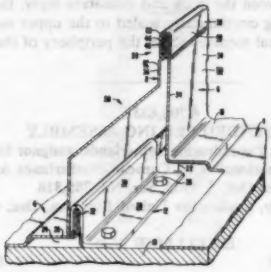
the supporting member to maintain said supporting member in said predetermined position.

4,706,434

STANDING SEAM STRUCTURE COVERING SYSTEM

Donald P. Cotter, Livermore Falls, Me., assignor to Alumax Inc., Mesquite, Tex.

Filed Feb. 28, 1986, Ser. No. 834,702
Int. Cl.[4] E04D *1/00*
U.S. Cl. 52—520 **11 Claims**



2. A standing seam structure covering system comprising:

a plurlity of elongate, parallel planes each having first and second parallel, upstanding edges, the first edge of panel interconnected with the second edge of an adjacent panel;

said first and second edges including upstanding portions and end portions, said end portions joined together to form a seam having a thickness substantially greater than the combined thicknesses of the first and second upstanding edges, the first and second upstanding edges spaced apart from one another by a chosen distance to create a cavity therebetween;

said panels including an upwardly extending internal lip extending into the cavity; and

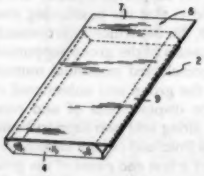
a plurality of brackets secured to the structure, each of the brackets having a portion sized for engaging said internal lip so to secure the interlocked panels to the structure, the brackets configured so as not to extend within the seam.

4,706,435

PREFABRICATED INTERLOCKING ROOFING SYSTEM

Victor M. Stewart, Redmond, Wash., assignor to Industrial Research Development, Inc., Kirkland, Wash.

Filed Dec. 2, 1986, Ser. No. 938,722
Int. Cl.[4] E04D *1/28, 3/35*
U.S. Cl. 52—533 **17 Claims**



1. A prefabricated roofing panel comprising:

panel means for covering a roof, said panel means comprising top and bottom flat surfaces and two opposite parallel side edges bevelled at an angle to said top and bottom surfaces, and

waterproof membrane means for covering said panel means, completely covering and adhered to the top surface of said panel means, said membrane means extending outwardly from said panel means at one end to form a headlap and at one side to form a sidelap,

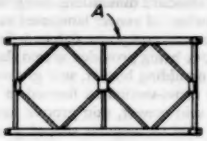
wherein the panel means is a rectangular panel and the longer pair of opposite side edges is bevelled, the sidelap extending across one of said bevelled side edges, and wherein a portion of a bevelled side edge is blunt cut adjacent a flat surface of the panel forming a bevelled portion adjacent one surface of the panel and a blunt cut portion adjacent the other surface of the panel.

4,706,436

LATTICE BRIDGES

Mabey, Bevil G., West Wittering, Great Britain, and David G. Mabey, Wargrave, Great Britain, assignors to Mabey & Johnson Limited, Twyford, England

Filed Apr. 1, 1986, Ser. No. 846,717
Int. Cl.[4] E04H *12/18;* E01D *9/00*
U.S. Cl. 52—645 **9 Claims**



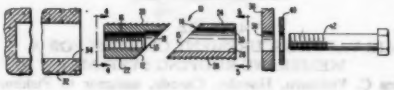
1. A lattice bridge construction system comprising lattice panels which are of substantially identical length or fractions or multiples thereof but of different depth relative to one another such that when variously combined with one another, with or without additional reinforcement, trusses having a range of incremental bending strengths in excess of those achievable by use of one size of panel only can be achieved, wherein the panels are of two or more different depths and can be superposed one above the other.

4,706,437

OFFSET ANCHOR

George C. Boecker, Jr., 3010 Lorena Ave., Baltimore, Md. 21230

Continuation of Ser. No. 739,922, May 31, 1985, abandoned. This application Jan. 20, 1987, Ser. No. 5,467
Int. Cl.[4] E04B *1/38;* F21D *20/00;* F16B *13/04*
U.S. Cl. 52—698 **3 Claims**



1. An anchor device, comprising:

a first portion, said first portion being generally circular in cross-section, said first portion having a first end and a second end, said first end being flat and at a right angle to the sides of the first portion, said second end being angular and truncated in relation to the sides of said first portion, said first portion forming a first generally cylindrical tube having an interior and an exterior, said first portion exterior having a plurality of serrations, said plurality of serrations being on one side of the exterior of the first cylindrical tube, the tube interior having a threaded portion adjacent the first end and a counter-bore located adjacent to the second end, said threaded portion and said counterbore communicating with each other to form a first longitudinal passageway generally concentric to the tube exterior and a second portion, said second portion being gen-

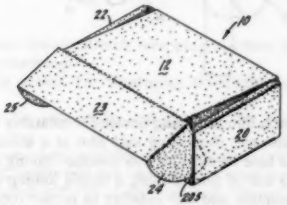
erally cylindrical in configuration, said second portion having a first end and a second end, said first end being flat and at a right angle to the sides of said generally cylindrical configuration, said second end being angular and truncated in relation to the sides of said generally cylindrical configuration, a longitudinal passageway through said second portion, with said longitudinal passage through said first portion communicating with said longitudinal passageway through said second portion, said second portion having a plurality of serrations, said plurality of serrations being on one side of said generally cylindrical configuration, said angular truncated second end of said first portion adapted to interface with said angular truncated second end of said second portion, said second portion having a longitudinal passageway havng generally smooth interior walls, the passageway being generaly oval in cross-section, the oval cross section having a long axis and a short axis, the long axis oriented perpendicular to said serrations, the centroid of the oval being displaced from the longitudinal axis of said second portion away from said serrations, and whereby, said plurality of serrations on said first portion and said second portion are arranged in vertical alignment and parallel to one another, the serrations of the first portion being located 180° around and from the serrations of the first portion, the serrations of each portion being saw tooth-like in configuration, said saw tooth-like configuration each having an external sharp point, the sharp point not exceeding and generally co-extensive with the outside diameter of its respective cylindrical configuration, said external sharp point of each saw tooth-like configuration being the uppermost side of each said saw tooth-like configuration.

4,706,438

CONDUCTIVE CONTAINER

Ralph C. Ohlbach, Deerefield, Ill., assignor to Conductive Containers, Inc., Northbrook, Ill.

Division of Ser. No. 838,292, Mar. 10, 1986, Pat. No. 4,684,020.
This application Apr. 23, 1987, Ser. No. 41,439
Int. Cl.[4] B65D *81/14*
U.S. Cl. 53—410 **6 Claims**



1. A method of constructing an inexpensive but effective carbon black circumvalate as a trap for static electricity originating outside or inside the trap and for dissipating induced currents so that goods inside the trap, which may be damaged by a discharge of static electricity or an induced charge, are protected, said method comprising:

(a) continuously surfacing a web of paperboard on opposed planar surfaces with a conductive carbon black dispersion, thereby to provide a web comprising opposed surfaces of conductive carbon black and uniting to said web a metal foil to lie adjacent a carbon black surface eventually to serve as a shield against an electromagnetic field and a radio frequency field;

(b) scoring the web and separating therefrom a carton blank including at least one flap, the separated edges of said carton blank bounding the metal foil and also bounding continuous carbon black surfaces;

(c) folding and erecting a carton from said separated blank so that said carbon black is present on outside and on inside surfaces of the carton, and to present said flap having carbon black on one side thereof in contact with carbon black on the inside of the carton when the flap is closed, thereby forming a carbon black circumvalate trap; and

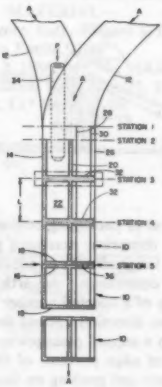
(d) inserting into such carton cavity electronic goods to be protected against the ravages of a discharge of static electricity or charges from a current induced on the shield in the presence of such a field.

4,706,439

METHOD OF FORMING A FILLED POUCH

Lewis Barton, 87 Chelsea Rd., Garden City, N.Y. 11530

Division of Ser. No. 656,608, Oct. 1, 1984, Pat. No. 4,635,291.
This application Sep. 4, 1986, Ser. No. 903,738
Int. Cl.[4] B65D *30/00*
U.S. Cl. 53—413 **10 Claims**



1. In a method of forming at least one flexible pouch having a sealed product-containing pocket for a viscous flowable food product and integral collar-forming structure externally of said pocket enabling said pouch to be suspended from an object, said pouch being formed of two sheets each constituted of a liquid-impervious laminated flexible material including a plastic film web and being arranged to provide two superimposed facing plastic film webs, which are advanced in the longitudinal direction of the webs; comprising the steps of:

(a) forming a pair of parallel spaced, continuous slits extending through at least one of said sheets of laminated material in the advancing direction thereof, said continuous slits being offset towards one longitudinal edge of said webs;

(b) forming first and second parallel spaced continuous side seals between said facing plastic webs in the advancing direction of said webs, one said side seal extending along the longitudinal edge of said webs remote from said continuous slits, and the second of said side seals being located proximate the inwardly located continuous slit in said web on the side thereof towards said first side seal;

(c) forming a continuous cross seal between said facing plastic webs extending over the width of said webs transversely of the advancing direction of said webs, said cross seal welding said containuous slits in the facing plastic webs at the intersecting locations therewith;

(d) filling a product into an upwardly opening pocket between said facing plastic webs bounded by said first and second side seals and said cross seal;

(e) and forming a second continuous cross seal between said webs subsequent to advancement of said webs a predetermined distance in the longitudinal direction of the webs so as to seal the pocket containing the product and concur-

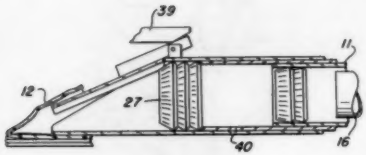
rently welding said continuous slits in the facing plastic webs at the intersecting locations therewith, whereby separation of the webs aong said continuous slits extending in the longitudinal direction of the webs intermediate said transverse seals provides a loop-like collar-forming strip of web material intermediate said continuous slits for suspending the pouch from the object.

4,706,440

METHOD AND APPARATUS FOR PACKAGING EXPANSILE ARTICLES

Charles W. Bittner, Haddonfield, N.J., assignor to Precision Automation Co., Inc., Haddonfield, N.J.

Filed Dec. 9, 1986, Ser. No. 939,785
Int. Cl.[4] B65B *63/02*
U.S. Cl. 53—438 **10 Claims**



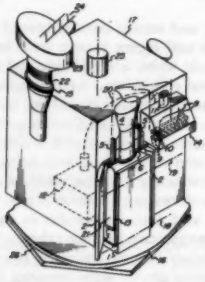
1. In the method of packaging resiliently expansile articles, the steps which comprise: passing a plurality of resiliently expansile articles longitudinally in one direction through a first passageway and constraining the articles against expansion, feeding a quantity of a selected number of the articles longitudinally in said one direction beyond and out of the first passageway and into a second passageway and permitting transverse expansion of edge portions of the said articles in said second passageway, and pushing on the upstream side only of an expanded edge portion of an article in the second passageway to shift the expanded article out of said second passageway for packaging.

4,706,441

ROTARY VACUUM BAGGING DEVICE EQUIPPED WITH SHAPING AND COMPACTING BOXES

Lucienne Chervalier, GEC 5 rue Denis Papin, Verneuil l'Etang 77390, France

Filed Oct. 17, 1986, Ser. No. 920,807
Claims priority, application France, Oct. 21, 1985, 85 15586
Int. Cl.[4] B65B *31/06, 51/14, 1/06, 1/22*
U.S. Cl. 53—512 **2 Claims**



1. A vacuum bagging device for continuously performing the functions of positioning, evacuating, filling and sealing a bag having an opening with material, comprising:

moveable platform;

tower means disposed on said platform for defining a plurality of work positions;

a plurality of chute means, each positioned at one of said tower work positions for locating the bag opening and guiding the material thereto;

a plurality of evacuation hood means, each positioned at one of said tower work positions to cooperate with said chute means for selectively evacuating the bag;

a plurality of shaping and compacting boxes positioned on said platform relative to said tower work positions to receive the bag, each of said shaping and compacting boxes having opposed side doors and having slide rails enabling said shaping and compacting box to move between a corresponding one of said chute means and said evacuating hood means;

vibration means positioned within said shaping and compacting boxes for compacting the material in the bag;

vacuum means communicating with said evacuation hood means for evacuating said bag after the material has been provided;

cleaning stretcher means positioned on said tower work position for removing dust from the top of the bag;

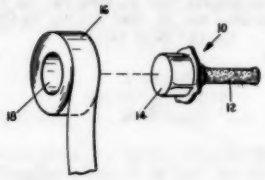
high pressure compacting means selectively positioned on said tower work position for closing and thermo-compressively welding the bag after the air and dust have been removed therefrom.

4,706,442

STRETCH FILM WRAPPING DEVICE

Paul K. Riemenschneider, Grandville, Mich., assignor to Highlight Industries, Inc., Grandville, Mich.

Filed May 27, 1986, Ser. No. 867,775
Int. Cl.[4] B65B *13/04*
U.S. Cl. 53—556 **25 Claims**



1. A stretch film wrapping device for rotatably suppoorting a roll of film and dispensing said film at a selected tension, including a base member, a hub member having a means for mounting a roll of film; a shaft; a means joining said shaft to said base member and hub member to permit rotation of said hub member with respect to said base member, including a friction means to resist rotation of said hub member with respect to said base member, wherein the improvement comprises:

said friction means having a pair of friction surfaces mounted on said shapft member, one of said friction surfaces is non-rotatably mounted to said base member and the other of which is non-rotably mounted on said hub member during retarted rotation of said hub member with respect to said base member each of said surfaces having an annular area extending substantially radially outward from said shaft member for frictional contact with the other of said surfaces;

at least one of said friction surfaces being made of a durable material having a low coefficient of friction so as to permit a broad range of braking forces to be exerted by said friction means;

compressible means mounted on said shaft member for exerting through said shaft member a selected force between said two frictional surfaces;

a retaining means against which said compressible means exerts a force mounted on said shaft; and

means for adjustably securing said retaining means on said shaft;

whereby a selected frictional force is maintained between said pair of frictional surfaces so as to oppose rotation of said hub member with respect to said base member.

4,706,443

CONSTANT TENSION STRETCH WRAPPING MACHINE

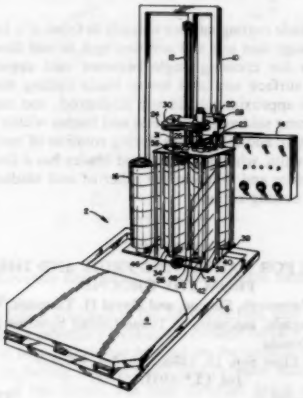
John R. Humphrey, Naples, Fla., assignor to International Packaging Machines, Inc., Naples, Fla.

Continuation of Ser. No. 374,741, May 4, 1982, Pat. No. 4,590,746, which is a continuation-in-part of Ser. No. 307,283, Sep. 30, 1981, abandoned. This application Mar. 14, 1986, Ser. No. 839,531

The portion of the term of this patent subsequent to May 27, 2003, has been disclaimed.

Int. Cl.[4] B65B *11/04*

U.S. Cl. 53—556 **15 Claims**



1. A constant tension stretch wrapping machine for wrapping a load comprising:

a dispensing means for dispensing stretchable wrapping material;

a turntable for supporting and rotating the load to be wrapped; and

a constant tension maintaining means disposed between the dispensing means and the turntable for applying stretchable wrapping material to the load with constant tension, said tension maintaining means including stretchable wrapping material engaging means for engaging the stretchable wrapping material between the turntable and the dispensing means, the stretchable wrapping material engaging means having a rotatable member mounted for rotation through a path of rotation around a pivot point with a first roller rotatably attached thereto at a point offset from the pivot point, the first roller engaging the stretchable wrapping material and defining a path of approach of the stretchable wrapping material between the dispensing means and the first roller and a path of departure of the stretchable wrapping material from the first roller; the rotatable member and the path of approach of the stretchable wrapping material defining a first angle and the rotatable member and the path of departure of the stretchable wrapping material defining a second angle, the first and second angles being substantially equal within the path of rotation and remaining equal while varying through the path of rotation, and means for applying a constant force to the rotatable member of the stretchable wrapping material engaging means at a point offset from the pivot point which applies a torque to the rotatable member which opposes a torque applied to the stretchable wrapping material engaging means by tension on said stretchable wrapping material in the paths of approach and departure, the torque applied to the rotatable member by the means for applying a constant force varying as a function of rotation of the rotatable member, being equal in magnitude to the torque applied by the tension on the stretchable wrapping material and opposing the torque applied by the tension on the stretchable wrapping material to the rotatable member whereby the tension on the stretchable wrapping material being applied to the load is constant during the rotation of the rotatable member.

4,706,444

APPARATUS FOR WRAPPING CONTINUOUSLY MOVING ARTICLES WITH HEAT-SHRINKABLE MATERIAL

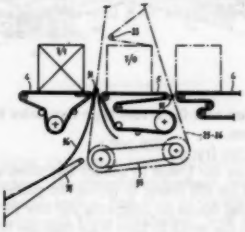
Mario Gambetti, Crevalcore, Italy, assignor to Baumer di Mario Gambetti, Castelfranco Emilia, Italy

Filed Oct. 2, 1986, Ser. No. 914,635

Claims priority, application Italy, Nov. 11, 1985, 3598 A/85

Int. Cl.[4] B65B *11/08*

U.S. Cl. 53—557 **5 Claims**



1. An apparatus for continuously wrapping a succession of articles comprising:

conveyor means defining a continuously moving transport path for said articles, said conveyor means including:

a first conveyor for delivering oncoming articles along a substantially horizontal surface thereof,

a second conveyor having a substantially horizontal surface coplanar with said horizontal surface of said first conveyor and spaced therefrom downstream along said path for receiving said articles from said first conveyor,

a third conveyor having a substantially horizontal surface coplanar with said horizontal surface of said second conveyor and downstream thereof along said path, all of said horizontal surfaces of said conveyors being driven in a common direction of advance of said articles along said path, and

means for reciprocating a leading edge of said horizontal surface of said second conveyor and a trailing edge of said horizontal surface of said third conveyor relative to an article on said third conveyor;

means for supplying sheets of a heat-shrinkable material to a location below said horizontal surfaces of said first and second conveyors; and

transport means for displacing at least one pair of bars spaced apart along said transport means in a closed path passing between said first and second conveyors and between said edges of said second and third conveyors in which one of said bars lifts one of said sheets between said horizontal surfaces of said first and second conveyors and applies the lifted sheet to a leading face of an article as it passes from said first conveyor onto said second conveyor and carries said lifted sheet over the top of the article as it moves along said second conveyor, while the other of said

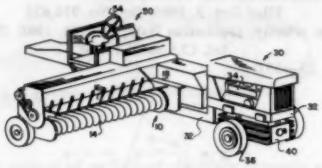
bars applies a previously lifted sheet to a rear face of an article previously transferred to said third conveyor from said second conveyor, said transport means being synchronized with said means for reciprocating said edges so that a leading portion of each sheet between said edges is advanced under each article on said third conveyor after said other bar has applied said sheet to the respective rear face, thereby causing said leading portion to meet a trailing portion of the same sheet brought to underlie the respective article by movement of the respective article onto the second conveyor.

4,706,445

HAY BALER CONVERSION KIT

Charles F. Woolsey, Hobbs, N. Mex., assignor to Blue Streak, Inc., Hobbs, N. Mex.

Filed Apr. 23, 1986, Ser. No. 855,126
Int. Cl.[4] A01D *34/43, 39/00, 43/02*
U.S. Cl. 56—14.7 **7 Claims**



1. A conversion unit for a tow type hay baler having
a. a baler frame,
b. an axle on the frame,
c. a gatherer on the frame to gather hay from a windrow,
d. a conveyor on the frame to move the gathered hay to
e. a press on the frame to compress the hay into a bale,
f. a knotter on the press to knot wire that has been wrapped around the compressed bale,
g. ground engaging wheels on the axle for moving the baler along windrows, and
h. mechanical baler power transmission means on the baler for transferring power to the baler;
comprising:
i. a conversion frame,
j. an internal combustion engine on the conversion frame,
k. at least one ground engaging steered and drive wheel journaled about a horizontal spindle,
l. steering means interconnecting the spindle and conversion frame for supporting, driving, and steering the conversion frame by the drive wheel,
m. connection means on the conversion frame for connecting the conversion frame to said baler frame so that the conversion frame may be supported in part by the baler frame,
n. conversion transmission means on the conversion frame for transferring power to the drive wheel and adapted to transfer power to the baler power transmission means.

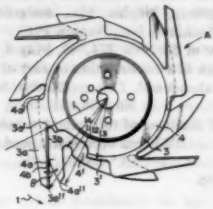
4,706,446

LAWN MOWER

Hachiro Doi, and Masayuki Yaegashi, both of Saitama, Japan, assignors to Fuso Keigokin Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 454,328, Dec. 29, 1982, Pat. No. 4,520,619. This application Dec. 21, 1984, Ser. No. 685,072
Claims priority, application Japan, Sep. 25, 1982, 57-167839
The portion of the term of this patent subsequent to Jun. 4, 2002, has been disclaimed.
Int. Cl.[4] A01D *34/52*
U.S. Cl. 56—295 **32 Claims**

1. A lawn mower comprising: a cutter unit including:
(a) a lower cutting unit having at least one lower blade having a cutting surface, said blade being attached to said lower cutting unit; and
(b) an upper cutting unit coaxial with said lower cutting unit around an axis, wherein said upper cutting unit is adapted to rotate in a direction t around said axis and wherein said upper cutting unit comprises: at least one upper blade thereon, and a cutting surface on said upper blade, having a first end and an second end, wherein said first end is closer to said axis than said second end, wherein said



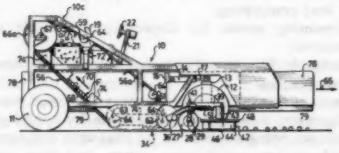
upper blade cutting surface extends in front of a line passing through said axis and said first end, in said direction t, wherein the crossing angle between said upper blade cutting surface and said lower blade cutting surface is between approximately 16 and 20 degrees, and means for maintaining said angle between said blades within a range between 16 and 20 degrees during rotation of one of said cutting units, wherein one of said blades has a linear cutting surface and wherein the other of said blades has an arcuate cutting surface.

4,706,447

MACHINE FOR HARVESTING FRUIT AND THE LIKE FROM THE GROUND

Robert R. Watmough, Simcoe, and David H. Timmins, Vanessa, both of Canada, assignors to Tobac Curing Systems Limited, Simcoe, Canada

Filed Sep. 15, 1986, Ser. No. 907,459
Int. Cl.[4] A01D *51/00*
U.S. Cl. 56—328 R **17 Claims**



1. Machine for harvesting fruit and the like from the ground comprising a frame moveable forwardly over the ground, a transverse conveyor connected to the frame and disposed transversely of the forward direction of travel for engaging fruit and the like on the ground and conveying the same transversely inwardly toward a transversely-inward end of the conveyor, an endless belt elevator supported on the frame having upstanding transverse flights on its inner side and having a lower generally horizontal portion extending adjacent the ground adjacent the inward end of the transverse conveyor and positioned to receive fruit and the like therefrom on its inner side and passing upwardly at an obtuse angle with respect to said horizontal portion and over an upper roller rotating with the conveyor belt and comprising outer disc members engaging the belt and an inner roller member of diameter smaller than said discs and concentric therewith and having its surface conforming approximately to the path of the upper ends of the flights, and said belt elevator continuing from said upper roller in an upper portion of its run spaced above said

lower horizontal portion, and downwardly toward said lower horizontal portion, and including a receiving member extending transversely below said upper portion of the belt elevator adjacent said upper roller for receiving fruit and the like passing over the roller, and inclining downwardly to one side of the belt elevator for guiding said fruit and the like toward a collection receptacle.

4,706,448

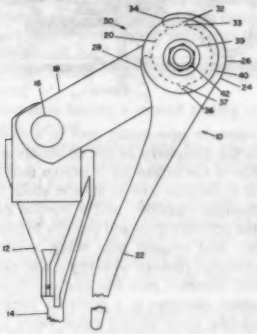
SNAP-AWAY HARVESTER TINE

James M. Gessel, Romeoville; Edward P. Jasper, and Gary L. Kunz, both of Mendota, all of Ill., assignors to HCC, Inc., Mendota, Ill.

Filed Feb. 19, 1986, Ser. No. 830,934

Int. Cl.[4] A01D *57/02*

U.S. Cl. 56—400 **12 Claims**



1. A harvester tine which survives extreme external forces, comprising:

a shaft fitting attached to the harvester reel, said shaft fitting having a generally cylindrical outside surface and including at least one detent located on the outside surface; and

a tine, including a finger and a split cylinder attached to one end of the finger, the split cylinder being shaped and dimensioned to engage the cylindrical outside surface of the shaft fitting and also including at least one detent which is shaped and oriented to interlock with the detent on the shaft fitting, the shaft fitting detent and the split cylinder detent being constructed to release from each other upon the application of a predetermined rotational force upon the finger, so that the entire split cylinder rotates as a unit on the shaft fitting only after release of the detents, and the split cylinder remains engaged with the shaft fitting after release of the detents.

4,706,449

APPARATUS FOR ASSEMBLING OPTICAL FIBERS ONTO A SUPPORT FILAMENT

Collin A. Akre, Clavet, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Nov. 21, 1986, Ser. No. 933,414

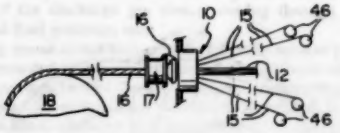
Int. Cl.[4] G02B *6/10, 6/16;* **H01B** *13/02;* **D01H** *13/04*

U.S. Cl. 57—6 **5 Claims**

1. Apparatus for assembling optical fibers into sinous grooves extending along the outer surface of a support filament comprising a laying head surrounding an axially extending passage for accommodating the support filament as it moves along a passline through the passage, the laying head:

(a) formed with a plurality of guide bores for optical fibers, said bores fixed in position within the head, and angularly spaced apart around and inclined relative to the passline with each bore having an inlet end disposed radially outwardly from an oulet end which lies at the surface of the axially extending passage and at the downstream end of the bore with respect to the direction of movement of the filament along the passline;

(b) having a plurality of groove locating projections associated with some at least of the guide bores, one bore to each projection, the projections extending into the passage each in a position axially to one side of and immediately adjacent the outlet end of its associated guide bore; and



(c) having a downstream end portion provided with a smooth annular outer surface which converges towards the passline in the downstream direction;

the apparatus also comprising a means for guiding a binder around the support filament from a binder supply station downstream from the laying head, said guiding means operable to guide binder around the annular surface whereby the binder will slide along the annular surface towards the passline.

4,706,450

BRAKE FOR AN OPEN-END SPINNING ROTOR

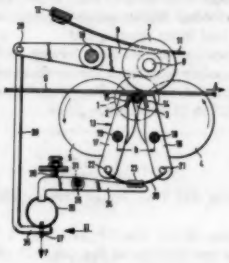
Wolfgang Feuchter, Deggingen-Reichenbach, and Dieter Goetz, Geislingen-Steige, both of Fed. Rep. of Germany, assignors to Fritz Stahlecker and Hans Stahlecker, both of, Fed. Rep. of Germany

Filed Mar. 24, 1987, Ser. No. 29,672

Claims priority, application Fed. Rep. of Germany, Apr. 24, 1986, 3613843

Int. Cl.[4] D01H *7/22, 7/885, 1/241*

U.S. Cl. 57—88 **13 Claims**



1. A brake for an open-end spinning rotor of the type having a horizontally disposed rotor shaft disposed in a wedge-shaped gap of at least one pair of supporting rollers with said rotor shaft being driven by a tangential belt, said brake comprising:

first and second brake shoes engagable with respective opposite sides of the rotor shaft for applying braking forces, said first brake shoe being movable in substantially the same direction as the tangential belt during braking operation,

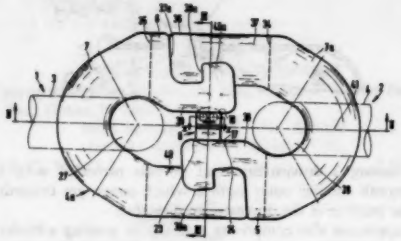
and brake shoe actuation means for actuating the brake shoes so that the first brake shoe engages the rotor shaft before the second brake shoe.

4,706,451

CHAIN LOCK FOR ROUND LINK CHAIN STRANDS PARTICULARLY FOR USE IN MINING

Wilfried Stromberg, Olfen, and Theo Kuhnigk, Datteln, both of Fed. Rep. of Germany, assignors to Becker-Pronte GmbH, Fed. Rep. of Germany

Filed Mar. 13, 1986, Ser. No. 839,065
Int. Cl.[4] F16G *15/04*
U.S. Cl. 59—85 **4 Claims**



1. A chain lock for joining round link chains, comprising:

a pair of interconnectable congruent part links, each part link having an outer shank and a generally parallel inner shank connected by a curved portion, said outer shank having an inwardly facing hook provided at the end thereof and said inner shank having an outwardly facing hook provided at its end such that when said pair of part links are interconnected, said inwardly facing hook and outwardly facing hook of one of said pair of part links respectively engage the outwardly facing hook and the inwardly facing hooks of the other of said pair of part links, each of said inner shanks further having an inner face opposite said outwardly facing hook and a cylindrically shaped recess provided in said inner face;

a center piece rotatably received in said cylindrically shaped recesses of said one and said other of said pair of part links when said inwardly and outwardly facing hooks are engaged, said center piece having flat side surfaces and arcuate end surfaces on the ends thereof which are rotatably received in said cylindrically shaped recesses to lock said pair of part links to each other, and a pin bore angularly provided therethrough adjacent to the inner face of one of said inner shanks; and

a pin driven in said pin bore having its opposite ends protruding externally from the surfaces of said center piece and engaging said inner face of said inner shank to prevent the rotation of said center piece.

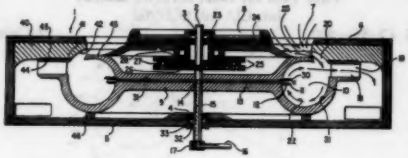
4,706,452

ENGINE

Gaston Lavoie, 145 York Street, Ottawa, Ontario, Canada K1N 8Y3

Continuation of Ser. No. 740,310, Jun. 3, 1985, abandoned, which is a continuation of Ser. No. 425,631, Sep. 28, 1982, abandoned. This application Sep. 25, 1986, Ser. No. 911,325
Claims priority, application Canada, Oct. 22, 1981, 338510
Int. Cl.[4] F02C *3/14, 3/06*
U.S. Cl. 60—39.35 **12 Claims**

1. A turbine engine, comprising: a main body portion defining a toroidal combustion chamber lying in a plane about an axis of symmetry, said combustion chamber being bounded by an internal wall defining in cross-section, normal to said plane, a generally circular cavity, an air intake for drawing in air in the axial direction; a disk-like compressor rotatable about said axis of symmetry; said compressor carrying at its periphery upstanding vanes offset by a predetermined angle to its radii; means for supplying fuel to said combustion chamber; an exhaust port for exhausting combustion gases leaving said combustion chamber; a disk-like rotor rotatable about said axis of symmetry and driven by said combustion gases and providing an output of the engine; and means coupling said rotor to the disk-like compressor for providing power thereto, said internal wall having a gap therein to provide an opening extending around the external periphery of the combustion chamber in said plane or a plane parallel thereto to form a common inlet-outlet port; a bypass passage outside said combustion chamber extending past said common inlet-outlet port and in direct communication therewith; the periphery of said disk-like compressor being located adjacent an inlet of the bypass passage such that the compressor draws air through the intake and ejects it by centrifugal action through the bypass passage



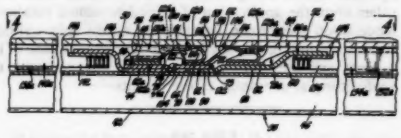
across the common inlet-outlet port in a direction generally tangential to the periphery of the combustion chamber, such that a portion of the intake air is drawn into the combustion chamber and undergoes a swirl motion about the circular axis of the combustion chamber, and a portion of the intake air flows over the common port and thereby bypasses the combustion chamber; said exhaust port being located adjacent the outlet of said bypass passage whereby it also exhausts intake air bypassing said common port and said combustion gases leave said combustion chamber in a generally tangential direction; and said disk-like rotor having rotor vanes located adjacent said exhaust means whereby said rotor is also driven by a mixture of intake and exhaust air passing through the bypass passage.

4,706,453

SUPPORT AND SEAL ASSEMBLY

Robert T. Vivace, Indianapolis, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 12, 1986, Ser. No. 929,480
Int. Cl.[4] F02K *3/10, 1/00*
U.S. Cl. 60—271 **4 Claims**



1. In a gas turbine engine having a case assembly including a transition duct defining an exhaust gas flow path from a turbine of said engine to an exhaust discharge of said engine, a plurality of porous metal liner segments adapted for disposition on said duct in spaced relation thereto and cooperating therewith in defining a cooling air plenum between said liners and said duct,

said liner segments having side edges extending in the direction of gas flow in said exhaust gas flow path, and

means for conducting cooling air to said cooling air plenum at a pressure exceeding the gas pressure in said exhaust gas flow path,

a support and seal assembly comprising:

an elongated retainer disposed in said cooling air plenum having an inboard surface and an outboard surface each extending in the gas flow direction in said exhaust gas flow path and parallel to said liner segment side edges,

means rigidly attaching said retainer to said duct with said

inboard surface separated from said duct and defining a retention space therebetween,

a plurality of first panel supports rigidly attached to one of said plurality of liner segments at intervals along a first side edge thereof and extending perpendicular to said first side edge,

a distal end of each of said first panel supports projecting into said retention space from one side of said retainer and being captured therein so that said first side edge of said one liner segment is attached to said duct,

a plurality of second panel supports rigidly attached to another of said plurality of liner segments immediately adjacent said one liner segment at intervals along a second side edge of said other liner segment parallel to said first side edge of said one liner segment and extending perpendicular to said second side edge,

a distal end of each of said second panel supports projecting into said retention space from the side of said retainer opposite said one side and being captured therein so that said second side edge of said other liner segment is attached to said duct,

a first sealing strip having a first sealing node extending the length thereof,

a second sealant strip having a second sealing node extending the length thereof,

means rigidly attaching each of said first and said second sealing strips to said retainer on said outboard surface thereof with said first sealing node engaging said one liner segment in continuous line contact adjacent said first side edge thereof and with said second sealing node engaging said other liner segment in continuous line contact adjacent said second side edge thereof so that said cooling air plenum is sealed at the gap between said one and said other liner segments, and

means biasing each of said first and said second sealing nodes into engagement on corresponding ones of said one and said other liner segments.

4,706,454

VEHICLE ANTI-POLLUTION EXHAUST DEVICE

Johnny M. Smith, Jr., 2957 Bridgeport, Anaheim, Calif. 92805, assignor to Johnny M. Smith, Jr., Anaheim, Calif.

Filed Jan. 31, 1986, Ser. No. 824,847
Int. Cl.[4] F01N *3/02*
U.S. Cl. 60—274 **12 Claims**

1. An exhaust filter for controlling emissions in a discharge gas stream comprising:

an outer housing;

a first exhaust gas passageway comprising a cylindrical pipe received within said outer housing, the pipe provided with a plurality of openings formed in an outer surface of the pipe and having a first end and a second end projecting from the housing, said cylindrical pipe receiving said discharge gas stream and defining a first fluid pathway through said outer housing for the gas stream;

a second exhaust passageway formed within said outer housing, in fluid communication with said first passageway and defining a second fluid pathway for receiving a selected portion of said discharge gas stream passing through the first fluid pathway;

a filter means placed within and filtering said selected portion of the discharge gas stream passing through said second fluid pathway; and

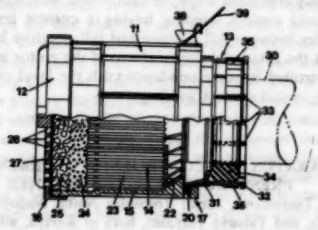
diverting means comprising at least one baffle spinner rotatably mounted within said cylindrical pipe adjacent one of said openings formed therein, progressively diverting the discharge gas stream from the first fluid pathway to the second fluid pathway and progressively diverting the filtered discharge gas stream from the second fluid pathway to the first fluid pathway.

4,706,455

FILTERING DEVICE FOR VEHICLE EXHAUST

Rolf Johnsson, Vattentornsgatan 138, S-427 37 Angered, Sweden

PCT No. PCT/SE84/00433, § 371 Date Aug. 14, 1986, § 102(e) Date Aug. 14, 1986, PCT Pub. No. WO86/03802, PCT Pub. Date Jul. 3, 1986
PCT Filed Dec. 18, 1984, Ser. No. 899,292
Int. Cl.[4] F01N *3/02*
U.S. Cl. 60—311 **5 Claims**



1. A filtering device which can be attached temporarily to an exhaust pipe of a vehicle during occasional indoor driving and the like, comprising:

a filter, and a filter holder including a double-sided open sleeve both ends of which have coupling means in the form of bayonet couplings for connection to a perforated cover attachable at one end of the sleeve, said cover covering said filter, said filter being locatable against a seat in the sleeve, and at the other end of the sleeve there is provided means for connecting the filtering device to an exhaust pipe, said connection means being adaptable to exhaust pipes of different diameters.

4,706,456

METHOD AND APPARATUS FOR CONTROLLING HYDRAULIC SYSTEMS

Bengt S. Backe, Dundee, and La Moyne W. Durham, Bartlet, both of Ill., assignors to South Bend Lathe, Inc., South Bend, Ind.

Filed Sep. 4, 1984, Ser. No. 647,158
Int. Cl.[4] G05B *19/14*; F16D *31/02*
U.S. Cl. 60—368 **11 Claims**

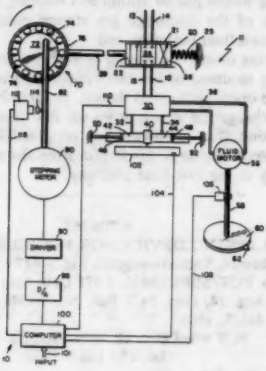
1. A precision driver for a multi-phase stepping motor having a plurality of windings comprising:

means for supplying DC current through each of said stepping motor windings; and

means for controlling said current in each of said windings linearly during operation of said stepping motor such that

substantially no current is induced into a control winding from adjacent windings;

wherein said stepping motor includes five phases and corresponding windings and said means for controlling said current includes separate power operational amplifier means connected in the current supply circuit of each of said windings and operably associated such that during



stepping motor operation four of said windings are continuously energized while the fifth of said windings functions as said control winding having a current level which varies between full positive and full negative levels such that the rotational displacement of the motor is precisely controlled in correspondence with the level of said current in said control winding.

4,706,457

APPARATUS FOR CONTROLLING WORKING GAS PRESSURE IN STIRLING ENGINES

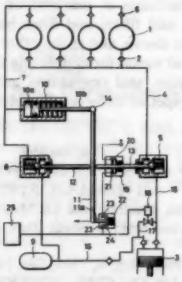
Masaru Tsunekawa, Aichi; Yoshihiro Naito, Nagoya; Masaya Hyodo, and Tatsuya Hayashi, both of Kariya, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha and Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, both of Aichi, Japan

Filed Jun. 25, 1986, Ser. No. 878,351

Claims priority, application Japan, Jun. 28, 1985, 60-140228

Int. Cl.[4] F02G *1/04*

U.S. Cl. 60—521 **1 Claim**



1. A working gas pressure control apparatus for a Stirling engine, which apparatus comprises:

a pressure boost valve provided in a minimum cycle pressure line connected to a working space by a first unidirectional valve;

a pressure reducing valve provided in a maximum cycle pressure line connected to said working space by a second unidirectional valve;

an operating lever for controlling opening and closing of said pressure boost valve and said pressure reducing valve;

a compressor connected by said pressure reducing valve and said pressure boost valves to said cycle pressure lines;

an unloading valve arranged in a circuit short-circuiting suction and discharge lines of said compressor; and

a control circuit for opening said unloading valve when any one of a rotational speed of the engine falls to a value lower than a present rotational speed for engine idling, the pressure boost valve is opened, and the engine is in a steady-state mode of operation.

4,706,458

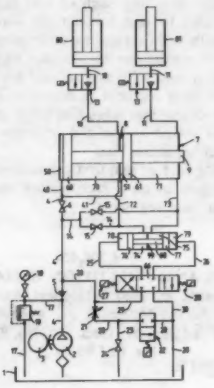
HYDRAULIC SYSTEM FOR CONTROLLING MOTOR VEHICLE LIFTS IN GENERAL

Remo Corghi, Correggio Emilia, Italy, assignor to Corghi Elettromeccanica S.p.A., Correggio Emilia, Italy

Filed May 29, 1986, Ser. No. 868,244

Int. Cl.[4] F15B *7/00*

U.S. Cl. 60—546 **5 Claims**



1. In a hydraulic system for controlling lifts which comprise two independent parallel platforms independently raised respectively by two cylinder-piston units **(80, 81)**, and having at least one pump **(2)** and a metering device **(7)** comprised of two identical coaxial cylinders with two pistons **(60, 61)** slidable therein and which are rigidly connected together by a rod **(9)** and divide the two cylinders respectively into first and second driving chambers **(50, 51)** which receive the pressurised fluid from the pump, and first and second operating chambers **(70, 71)** which feed identical quantities of hydraulic fluid respectively to the two cylinder-piston units **(80, 81)**, the improvement comprising, a balancing device comprised of two identical coaxial cylinders, two pistons **(76, 77)** respectively dividing the cylinders of the balancing device into a thrust chamber and a compensating chamber to form first and second thrust chambers **(78, 79)**, and first and second compensating chambers **(74, 75)**, a rod **(88)** rigidly connecting said pistons together for movement in unison so that the volume of either compensating chamber increases as the volume of the other compensating chamber decreases; conduit means **(72)** connecting said first compensating chamber **(74)** of the balancing device to said first operating chamber **(70)** of the metering device, conduit means **(73)** connecting said second compensating chamber **(75)** of the balancing device to the second operating chamber **(71)** of the metering device, valve means **(66)** moveable to a first position and to a second position, said valve means in said first position connecting said first thrust chamber **(78)** to a source of pressu-

rised fluid, and said second thrust chamber (79) to a discharge pipe, to force a volume of fluid from said first compensating chamber (74) into the first operating chamber (70) and to receive an equal volume of fluid in said second compensating chamber (75) from the second operating chamber (71), said valve means in said second position connecting said second thrust chamber (79) to said source of pressurised fluid, and said first thrust chamber (78) to said discharge pipe to force a volume of fluid from said second compensating chamber (75) into the second operating chamber (71) and to receive an equal volume of fluid in said first compensating chamber (74) from the first operating chamber (70), and means for actuating said valve means (66) to said first and second positions in response to a pretermined sensed difference in height between the two platforms.

4,706,459

COOLED HYDRAULIC HIGH-PERFORMANCE BRAKE SYSTEM FOR MOTOR VEHICLES

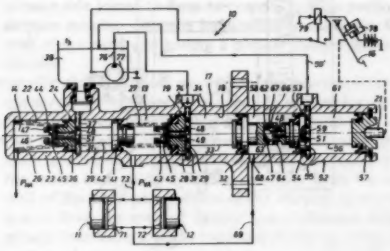
Manfred Burckhardt, Waiblingen, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Oct. 5, 1984, Ser. No. 658,035

Claims priority, application Fed. Rep. of Germany, Oct. 5, 1983, 3336114

Int. Cl.⁴ B60T *11/20, 5/00;* **F16D** *65/78*

U.S. Cl. 60—562 **7 Claims**



1. A cooling apparatus for a motor vehicle hydraulic brake system having at least one wheel brake cylinder, a pump having an output and communicating with a supply vessel having an input, a tandem main cylinder comprising at least a primary piston, a secondary piston, a separating flange disposed between the primary and secondary pistons, a primary outlet pressure space disposed between the primary piston and the separating flange, and a follow-up space disposed between the secondary piston and the separating flange, and

wherein an additional functional space is limited by an intermediate flange and an auxiliary piston forming part of the primary piston, and an additional follow-up space of the tandem main cylinder is limited by an end flange and said auxiliary piston forming part of the primary piston, said additional follow-up space communicates with the supply vessel and said additional functional space and said additional follow-up space communicating with said at least one wheel-brake cylinder, and wherein

a stream of brake fluid is guided from the pump outlet by a path directly into the primary outlet-pressure space of the tandem main cylinder to the at least one wheel-brake cylinder, and then via a return line into the additional functional space and additional follow-up space of the tandem main cylinder to said supply vessel.

4,706,460

HYDRAULIC BRAKE VALVE CAPABLE OF OPERATING AS CONVENTIONAL MASTER CYLINDER WHEN BRAKE PRESSURE SOURCE FAILS

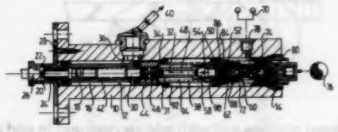
Gilbert Kervagoret, Argenteuil, France, assignor to Bendix France, Paris, France

Filed Feb. 6, 1986, Ser. No. 827,130

Claims priority, application France, Feb. 20, 1985, 85 02460

Int. Cl.⁴ B60T *17/18, 11/32*

U.S. Cl. 60—565 **4 Claims**



1. A hydraulic assistance device, comprising a casing provided with a first bore in which first piston means is mounted slideably, the first piston means capable of displacement by means of a brake pedal between a first position allowing communication between a first chamber connected to a braking circuit and a low pressure reservoir and which position isolates the first chamber from a high pressure fluid source, and a second position isolating the first chamber from the low pressure reservoir and causing the chamber to communicate with the high pressure fluid source, the device also including a second chamber formed in the casing, means of communication between the first chamber and the reservoir including a second bore in which second piston means is mounted slideably, the second piston means including a bore, the first piston means having a bore in which a plunger is slideably mounted, the plunger joining the first piston means to the second piston means, and valve means for closing the means of communication between the first chamber and the reservoir under the effect of the displacement of the first piston means, characterized in that the first chamber is isolated from the second chamber by a seal which is mounted slideably in the first bore and is capable of being moved by the first piston means when hydraulic pressures in the first and second chambers are essentially equal, the seal biased by spring means connected with the first piston means, and the device including a sleeve which is mounted fixedly in the first bore and which forms with the first bore the first chamber, the seal mounted slideably about the sleeve.

4,706,461

AMBIENT AIR MODULATOR FOR ENGINE FLUID HEAT EXCHANGER

Howard L. Pratt, and Robert J. Selzer, both of Fort Wayne, Ind., assignors to Navistar International Transportation Corp., Chicago, Ill.

Filed Feb. 14, 1986, Ser. No. 830,381

Int. Cl.⁴ F02B *29/04;* **F01P** *7/02*

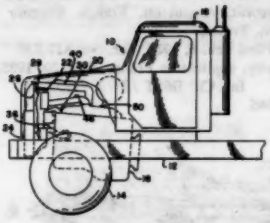
U.S. Cl. 60—599 **11 Claims**

5. A charge air cooler assembly for a turbocharged engine comprising:

a core assembly comprising a plurality of charge air tubes extending in parallel relation from a first side of the core to a second side and defining ambient air openings extending perpendicular to said charge air tubes extending through said core, said charge air tubes and said air openings being alternately disposed along a face side of said core perpendicular to said first and second sides, the spacing of said charge air tubes being approximately equal to the thickness of said tubes along said face;

an apertured plate slidably mounted to said charge air cooler adjacent said entire face of said core without intervening structure for movement perpendicular to said charge air tubes between an open position permitting air flow in a

closed position preventing air flow, the apertures in said plate being disposed to align with said charge air tubes in



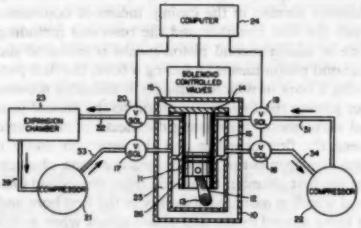
said closed position and with said air openings in said open position.

4,706,462

METHOD FOR DRIVING AN ENGINE

Gilbert W. Soltermack, Bayview, Tex., assignor to Jim L. De Cesare, Houston, Tex.

Filed Oct. 14, 1986, Ser. No. 917,841
Int. Cl.[4] F01B 29/04
U.S. Cl. 60—712 12 Claims



1. The method of improving the overall efficiency of an internal combustion engine having at least one piston, cylinder walls, a combustion drive cycle, an engine block, and an engine cooling system including a jacket surrounding the cylinder walls and piston, comprising the steps of collecting heat generated in the engine block in a separate chamber located interiorly of the cooling jacket, producing high pressure steam in the separate chamber with the collected heat, selectively driving at least one piston of the engine with the high pressure steam while simultaneously de-activating the combustion drive for said piston, selectively deactivating the steam drive for said piston while simultaneously re-activating the combustion drive for said piston and using a microprocessor to selectively de-activate the combustion and steam drives, and to selectively re-activate the combustion and steam drives, delaying with the microprocessor the steam drive until the steam pressure in the chamber is at least equal to pressure of combustion from gasoline selecting with the microprocessor one of a plurality of cylinders next to be fired, determining with the microprocessor a point at which the steam pressure in the chamber is at least equal to the gasoline combustion pressure, and controlling with the microprocessor switching of the switching of the selected cylinder between the combustion drive and the stream drive, passing exhaust steam from the cylinder to an expansion chamber having a volume which is at least equal to that of the cylinder in order to reduce any back pressure that occurs during each exhaust cycle of the cylinder, compressing the steam from the expansion chamber in two stages and returning the compressed steam to the cylinder.

4,706,463

RECOVERY OF MICROORGANISM HAVING ICE NUCLEATING ACTIVITY

Carole B. Lindsey, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 23, 1986, Ser. No. 910,552
Int. Cl.[4] F25D 17/02
U.S. Cl. 62—64 5 Claims

1. A method for the recovery of a microorganism which has ice nucleating activity from a fermentation medium said method comprising the steps of:

(a) bringing the temperature of said medium to a temperature of about 15° C. or less,

(b) forming a concentrate of said microorganism while maintaining the temperature of about 15° C. or less,

(c) running said concentrate into a cryogenic liquid in the form of a fine stream so as to form frozen pellets of the concentrate, and

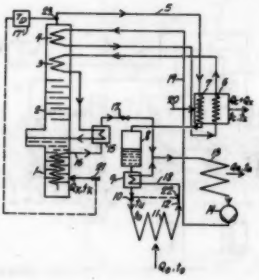
(d) freeze drying said pellets at a temperature below 25° C.

4,706,464

METHOD AND APPARATUS FOR THE AUTOMATIC CONTROL OF A SORPTION HEAT TRANSFER PLANT

Josef Kreutmair, Pfaffenhofen, Fed. Rep. of Germany, assignor to Man Technologie GmbH, Munich, Fed. Rep. of Germany

Filed Mar. 4, 1986, Ser. No. 835,971
Claims priority, application Fed. Rep. of Germany, Mar. 6, 1985, 3507887
Int. Cl.[4] F25B 15/00
U.S. Cl. 62—101 9 Claims



1. A method for the automatic control of a sorption heat transfer plant comprising heating a solution in a boiler to produce enriched coolant in the state of a vapor which flows in a refrigerant circuit through a condensor and an evaporator as a refrigerant to an absorber, cooling said vapor in said condensor to liquid state by a coolant flowing through said condensor, conveying a portion of the solution in the boiler in a solution circuit as a relatively weak solution to said absorber, producing an enriched solution at the output of the absorber from said refrigerant and said portion of the relatively weak solution, conveying said enriched solution in a coolant circuit to cool the vapor produced in the boiler whereafter said solution returns to said boiler,

controlling the supply of the condensate from the condensor to the evaporator and the flow of the relatively weak solution to the absorber to provide a minor degree of overheating of the refrigerant at the outlet of the evaporator as related to pure refrigerant,

controlling the heat supplied to the boiler in accordance with the temperature of the refrigerant vapor leaving the boiler, and

effecting said cooling of the vapor produced in the boiler by the enriched solution from the absorber in two stages and cooling the enriched solution between said stages by the

coolant flowing through the condensor whereafter said enriched solution is conveyed to said boiler.

4,706,465

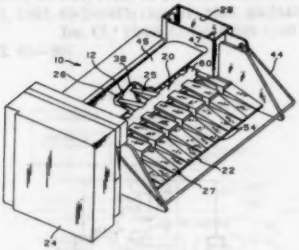
ICE PIECE EJECTION MECHANISM FOR ICEMAKER

Stephen Searl, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Oct. 6, 1986, Ser. No. 915,622

Int. Cl.[4] F25C *5/04*

U.S. Cl. 62—137 **10 Claims**



1. An icemaker comprising:

a freezer mold having a front wall and a back wall with a plurality of partitioned walls disposed within the mold to define a plurality of cavities along the longitudinal central axis of the mold in which water is to be frozen to form ice pieces having a crescent shape with a flat side and an arcuate side joined to form two opposite edge portions,

a stripper member disposed longitudinally along the front wall of the mold and having a portion thereof above the cavities,

means for ejecting the ice pieces from the mold including an ejector rotatable in only one direction and having an axle along the longitudinal central axis of the mold, and

an ice piece ejector guide secured to the back wall of the mold and located above the cavities longitudinally along the mold, said guide extending laterally from the back wall of the mold past the axle of the rotating ejector and spaced from the rotating ejector axle a distance slightly greater than the maximum thickness of the ice piece, said guide and rotating ejector cooperating to move the ice pieces above the cavities between the guide and axle of the rotating ejector and force the ice pieces onto the stripper member to thereby move any previously harvested ice pieces off the stripper member.

4,706,466

UNDER THE COUNTER ICE MAKING MACHINE

Thomas E. Yingst, Aurora, Colo., and Fredrick A. Weis, Chattanooga, Tenn., assignors to Mile High Equipment Company, Denver, Colo.

Filed Sep. 3, 1986, Ser. No. 903,392

Int. Cl.[4] F25C *1/04*

U.S. Cl. 62—138 **12 Claims**

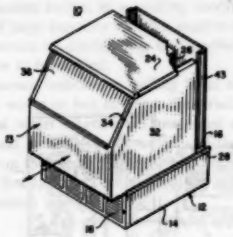
1. An under the counter ice making machine comprising:

(a) a freezer compartment having a first portion, a second portion immediately above the first portion and a top panel immediately above the second portion;

(b) a bottom compartment having side panels, a front panel including a grille, and a rear panel, the rear panel having a portion extending upwardly of the bottom compartment, past the freezer compartment first and second portions to the top panel;

(c) a refrigeration means including a condenser, condenser fan, and compressor mounted in the bottom compartment and an evaporator means located in the freezer compartment second portion and attached to the extended portion of the bottom compartment rear panel for support;

(d) said first portion of the freezer compartment forming an ice bin having a bottom forming a partition between the bottom and freezer compartments, a front panel, side panels, and a rear panel, the front panel, side panels, and rear panel having freezer compartment second portion extensions forming, respectively, an upper door support-



ing means, side panels and top panel, and rear panel enclosing members for enclosing the upwardly extending portion of the bottom compartment rear wall; and

(e) a door means including a door mounted in the upper door supporting means for completing the second portion of the freezer compartment; whereby the freezer compartment is slidably removable for cleaning the first and second portions and for exposing the refrigeration means including the evaporator for maintenance and repair.

4,706,467

CONTROL CIRCUIT FOR A REFRIGERATING DEVICE

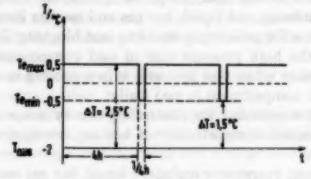
Niels P. Thorsen, Sonderborg; Gilbert W. Jessen, Broager; Erik Thomsen, and Jens R. Sorensen, both of Nordborg, all of Denmark, assignors to Danfoss A/S, Nordborg, Denmark

Filed Dec. 3, 1986, Ser. No. 937,399

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1985, 3545602

Int. Cl.[4] F25C *1/00*; F25D *17/02*

U.S. Cl. 62—139 **3 Claims**



1. A refrigeration unit, comprising, a vessel for receiving cooling water, a heat exchanger mounted in said vessel, a compressor having switching means, evaporator tubing connected to said compressor and mounted on the inner wall of said vessel, a sensor mounted on predetermined distance from said evaporator tubing for monitoring the formation of an ice layer on said tubing, thermostatic control circuit means connected to and responsive to said sensor for switching said compressor on and off between temperature differentials characterized by first and second temperature ranges associated respectively with first and second sequentially generated time periods, said first temperature range being approximately between $+1\frac{1}{2}$° C. and -2° C. and said second temperature range being approximately between $-\frac{1}{2}$° C. and -2° C.

4,706,468

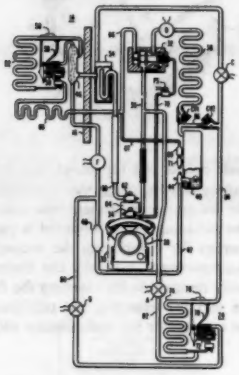
COMPARTMENTALIZED TRANSPORT REFRIGERATION SYSTEM

Leland L. Howland, Belle Plaine, and Jayaram Seshadri, Minneapolis, both of Minn., assignors to Thermo King Corporation, Minneapolis, Minn.

Division of Ser. No. 915,827, Oct. 6, 1986. This application Apr. 9, 1987, Ser. No. 36,539

Int. Cl.[4] F25B 5/00

U.S. Cl. 62—199 3 Claims



1. A compartmentalized transport refrigeration system, comprising:

a trailer having a first compartment,

a host refrigeration unit for controlling the air temperature of said first compartment via heating, cooling and null modes,

said host unit comprising a closed fluid circuit which includes a compressor, condenser, receiver, evaporator, accumulator, and liquid, hot gas and suction lines,

first means for selectively enabling and blocking fluid flow from the high pressure side of said compressor to said condenser when said host unit is in a cooling mode,

a second compartment in said trailer,

a remote evaporator for controlling the air temperature of said second compartment via heating, cooling, and null modes,

said remote evaporator including liquid, hot gas and suction lines connected to the liquid, hot gas and suction lines, respectively, of said host unit,

second, third and fourth means for respectively and selectively enabling and blocking fluid flow between said remote liquid, hot gas and suction lines and said host unit,

one-way by-pass means interconnecting the suction line of said remote evaporator and the receiver of said host unit,

and control means for selecting the fluid blocking positions of said first, second and fourth means when the third means connects the hot gas line of the host unit to the remote evaporator, to direct the output of the compressor to the remote evaporator and cause the one-way by-pass means to connect the remote suction line to the receiver, to enhance the heating capability of the remote evaporator.

4,706,469

REFRIGERANT FLOW CONTROL SYSTEM FOR USE WITH REFRIGERATOR

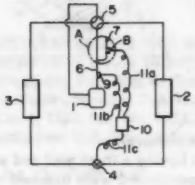
Kensaku Oguni; Kyuhei Ishibane; Shigeaki Kuroda, all of Shimizu; Hiromu Yasuda, Shizuoka; Takashi Sano, and Hironori Etou, both of Shimizu, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 19, 1987, Ser. No. 16,404

Claims priority, application Japan, Mar. 14, 1986, 61-54809; May 21, 1986, 61-114602

Int. Cl.[4] F25B 41/04

U.S. Cl. 62—222 12 Claims



1. A refrigerant flow control system for a heat pump type air conditioner incorporating a refrigerant circulating circuit having a compressor, an indoor heat exchanger, an expansion valve, an outdoor heat exchanger and a four-way valve, said system comprising:

a branch pipe extending from an intermediate portion of a refrigerant pipe connecting a discharge port of said compressor to said four-way valve, and having one sealed free end;

a first temperature sensor disposed on said branch pipe in the vicinity of said sealed free end thereof for detecting a saturated condensation temperature of said refrigerant which is condensed in said branch pipe;

a second temperature sensor disposed on a discharge pipe of said compressor for detecting a discharge temperature of the gaseous refrigerant discharged from said compressor; and

a control device for receiving signals from said first and second temperature sensors, which are representative of the temperatures detected by said sensors, said control device calculating a difference between said saturated condensation temperature and said discharge temperature of said gaseous refrigerant, and a degree of superheat of said gaseous refrigerant discharged, comparing a predetermined degree of superheat with said calculated degree of superheat, delivering to said expansion valve a command signal corresponding to the difference therebetween, and controlling an opening degree of said expansion valve, whereby, if said calculated degree of superheat is higher than said predetermined degree of superheat, said opening degree of said expansion valve is controlled to be increased, while if said calculated degree of superheat is lower than said predetermined degree of superheat, said opening degree of said expansion valve is controlled to be decreased, so that a predetermined degree of superheat is consistently maintained.

4,706,470

SYSTEM FOR CONTROLLING COMPRESSOR OPERATION

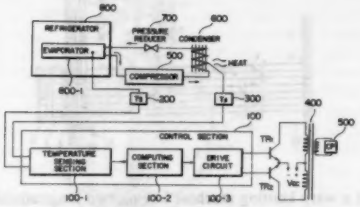
Naoki Akazawa, Ohta; Kazuhiko Nishi, Gunma; Naoya Kawakami, Ohta; Yoshiaki Fujisawa, Kumagaya, and Noriyoshi Yamada, Nitta, all of Japan, assignors to Sawafuji Electric Co., Ltd., Japan

Filed May 14, 1986, Ser. No. 863,129

Claims priority, application Japan, May 16, 1985, 60-104387; May 16, 1985, 60-104388; Oct. 31, 1985, 60-244451; Oct. 31, 1985, 60-244452; Oct. 31, 1985, 60-244453; Oct. 31, 1985, 60-244454; Oct. 31, 1985, 60-244455; Oct. 31, 1985, 60-244456; Oct. 31, 1985, 60-244457; Oct. 31, 1985, 60-244459

Int. Cl.[4] F04B *17/04*; F25B *1/00*

U.S. Cl. 62—209 **23 Claims**



1. A system for controlling the operation of a vibrating compressor comprising: a first sensor for detecting the pressure of the refrigerant sucked by the compressor; a second sensor for detecting the pressure of the refrigerant compressed and discharged by the compressor; control means including means for converting signals detected by said first and second pressure sensors into predetermined electrical signals; computing means for generating an output having a predetermined frequency representing the frequency at which the compressor can operate at the resonant frequency based on the electrical signal from said pressure sensing means; and, a drive circuit for generating a drive signal corresponding to said output fed by said computing section.

4,706,471

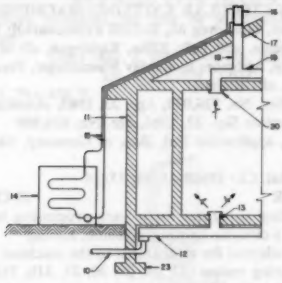
SOLAR CHIMNEY

Louis E. Alexander, 1881 2nd Ave., Sutter, Calif. 95982

Filed Mar. 15, 1985, Ser. No. 712,240

Int. Cl.[4] F25B *27/00*

U.S. Cl. 62—235.1 **11 Claims**



1. A heat input device system comprising:

(a) a heat input device constructed of tubing, comprising a circular top ring joined by vertical tubes to a circular bottom ring, and having an inlet port at the top ring and an outlet port at the bottom ring;

(b) a means of collecting and transfering heat to a fluid medium;

(c) a means of transferring said heated fluid to the heat input device from the means of collecting said heat, and to the inlet port which is at the highest point of said heat input device;

(d) a means of transferring said fluid from the lowest port of the heat input device back to the means of collecting said heat;

(e) duct means buried in a cooling medium, generally the earth, of large capacity which is used to cool incoming air;

(f) duct means of distributing said cooled air through the structure to be cooled;

(g) duct means installed at ceiling level and above used to exhaust warm or hot air from the structure to be cooled;

(h) exhaust outlet wherein the heat input device is added to input heat to the natural outflow of the exhaust thereby increasing the exhaust outflow and thereby increasing the inflow through the cooling medium and thence through the structure being cooled.

4,706,472

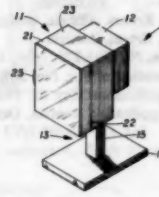
REFRIGERATED COSMETIC STORAGE CONTAINER

Margot O. Howard, 6626 Gold Run Ave., Sacramento, Calif. 95842

Filed Feb. 9, 1987, Ser. No. 12,342

Int. Cl.[4] A47F *3/04*

U.S. Cl. 62—246 **19 Claims**



1. A refrigerator for lipsticks that includes:

a. a storage cabinet for lipsticks,

b. a refrigeration generation section in cooling communication with said storage cabinet,

c. a base comprising a vertical post attached to said storage section, and to a horizontal stand,

said storage cabinet having a storage section, and a hingeable door hingedly connected to said storage section, said door including means for storing elongated lipstick tubes therein,

and said storage section having a plurality of lipstick storage compartments,

and means for carrying refrigerated air generated in said refrigerator section to said storage section and means for removing warm air from said storage section.

4,706,473

ESPRESSO ICE-CREAM MACHINE

Alberto Cipelletti, San Fiorano, Italy, assignor to Ditta Cipelletti Alberto, Italy

Filed Feb. 20, 1987, Ser. No. 17,269

Claims priority, application Italy, Feb. 21, 1986, 19501 A/86

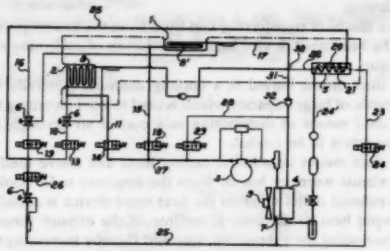
Int. Cl.[4] A23G *9/16*

U.S. Cl. 62—342 **4 Claims**

1. A machine for making espresso ice-cream, of the the type comprising a pressurized gas refrigerating circuit composed of a compressor, a condenser, one or more lamination valves as well as coils in thermal exchange relationship with a mixture storage vat and a mixing and whipping cylinder, characterized in that the said refrigeration circuit further comprises an evaporator as well as tubes and valves to connect, alternatively and

selectively, the components of the circuit itself, the evaporator and the coils in one of the following orders:

(a) compressor, coils, condenser, lamination valve(s), evaporator, compressor;



(b) compressor, condenser, lamination valve(s), coils, evaporator, compressor;

respectively for heating and cooling the contents of the mixture storage vat and the mixing and whipping cylinder.

4,706,474

PROCESS OF MANUFACTURING A KNITTED PILE FABRIC

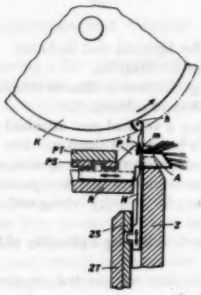
Walter R. Schmidt, Krems, Austria, assignor to Karl Eybl Gesellschaft m.b.H., Krems, Austria

Continuation of Ser. No. 591,775, Mar. 21, 1984, abandoned, which is a continuation of Ser. No. 308,253, Oct. 5, 1981, abandoned. This application May 12, 1986, Ser. No. 863,809

Claims priority, application Austria, Oct. 29, 1980, 5315/80

Int. Cl.[4] D04B *9/12*

U.S. Cl. 66—9 B **7 Claims**



1. A method for producing a plain or patterned high-pile or sliver-knit fabric on a circular knitting machine comprising a cylinder carrying latch needles having hooks, a sinker ring carrying sinkers having knock-over or knitting edges, carding means associated therewith and arranged for combing-in pile fibers to the needle hooks, cam arrangements for actuating the needles and the sinkers cooperatively with the associated carding means, and feeding means for delivering base threads to the needles for knitting a base fabric therefrom incorporating said pile fibers, which comprises the improvement of raising the needles receiving the combed-in pile fibres at the start of combing-in to a level at which the tips of the latches of the raised needles are positioned below the knock-over or knitting edges of the sinkers and the stitches of a previously knitted course of the fabric remain on said latches, and combing-in the pile fibers at said level.

4,706,475

DEVICE FOR PRESENTING WEFT YARNS TO THE KNITTING NEEDLES OF A WARP KNITTING MACHINE

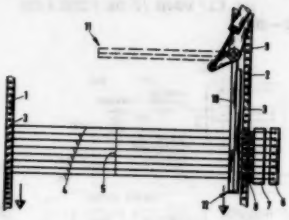
Roland Wunner, Schwerzenbach/Wald, Fed. Rep. of Germany, assignor to Liba Maschinenfabrik GmbH, Naila, Fed. Rep. of Germany

Filed Dec. 18, 1986, Ser. No. 943,674

Claims priority, application Fed. Rep. of Germany, Sep. 13, 1986, 3631217

Int. Cl.[4] D04B *23/06*

U.S. Cl. 66—84 A **6 Claims**



1. In a warp knitting machine having two longitudinal conveyors for conveying weft yarns towards a knitting head, said conveyors comprising a plurality of hooks for engaging said weft yarns; and a weft yarn carriage for laying groups of weft yarns from one conveyor to the other; the improvement comprising:

(a) a depressor having an inactive position, and intermediate position and a depressing position;

(b) means for moving said depressor from said inactive position to said intermediate position, extending over a group of weft yarns laid between the hooks on one of said conveyors;

(c) means for lowering said depressor from said intermediate position to the depressing position to depress said group of weft yarns into the hooks of said conveyor after said weft yarn carriage has positioned said group of weft yarns over said conveyor; and

(d) means for moving said depressor to said inactive position after said weft yarn carriage has moved past said depressor towards the other conveyor and said weft yarns held by said depressor have been hooked into the hooks of said one conveyor.

4,706,476

YARN SUPPLY APPARATUS FOR TEXTILE MACHINES ESPECIALLY CIRCULAR KNITTING MACHINES

Gustav Memminger, Heideweg 65, D-7290 Freudenstadt; Erich Roser, Bermatingen, and Falk Kühn, Kiebingen, all of Fed. Rep. of Germany, assignors to Gustav Memminger, Freudenstadt, Fed. Rep. of Germany

Continuation of Ser. No. 726,070, Apr. 23, 1985, abandoned. This application Sep. 22, 1986, Ser. No. 910,809

Claims priority, application Fed. Rep. of Germany, May 2, 1984, 3416195

Int. Cl.[4] D04B *15/48, 35/14*

U.S. Cl. 66—132 R **21 Claims**

1. A yarn feeding apparatus for a yarn processing textile machine, such as a circular knitting machine, having

a holder (1, 1') adapted for attachment to the machine; yarn guide monitoring means (27, 28, 29; 30, 31, 310, 311) secured to the machine for guiding and monitoring feed of yarn (25, 25*a*);

an electric motor (10) secured to said holder;

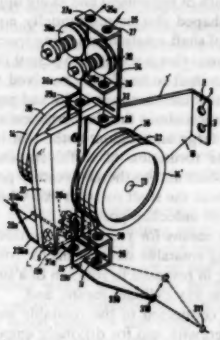
and at least one yarn feed element (14, 14', 514) feeding yarn, in a slip-free manner, from the circumference thereof to a yarn utilization position,

wherein said electric motor is a stepping motor (10);

electric energy pulse supply means (60–66) are provided, for energizing the stepping motor to rotate at a predetermined speed; and supplying, continuously stepping motor supply pulse trains;

said at least one yarn feed element (14, 14', 514) is coupled, in driving relation, to the stepping motor;

the yarn guide and monitoring means (27–29; 30–33, 310, 311, 330, 330*a*) include a movable yarn run-off yarn guide-and-feeler (330, 330*a*) located with respect to the yarn guide element to sense the tension condition of yarn being supplied from the yarn feed element to the yarn utilization position of the textile machine, said run-off yarn guide-and-feeler being assigned to the respective at least one feed element (14, 14', 514) for guiding and monitoring yarn being fed and supplied thereby;



and switch means (S, 70, 70*a*) are provided, controlled by the run-off yarn guide-and-feeler (330, 330*a*), controlling, during operation of the textile machine, in an ON-OFF manner, as a function of sensed yarn being required by the sensed yarn being required by the textile machine at the yarn utilization position, selectively, either

(a) interrupting of transmission of rotary power from the stepping motor to the feed element upon termination of requirement of yarn by the textile machine at the yarn utilization position,

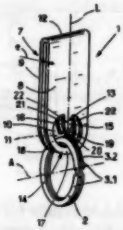
(b) continue transmission of rotary power from the stepping motor to the associated feed element (14, 14', 514) as determined by said pulse supply means, upon requirement of yarn by the textile machine at the yarn utilization position.

4,706,477

KEY RING TYPE DEVICE

Jean-Pierre Rousseau, 96, Rue de Miromesnil, 75008 Paris, France

Filed Mar. 2, 1987, Ser. No. 20,305
Int. Cl.[4] B25B *33/00*
U.S. Cl. 70—456 R **12 Claims**



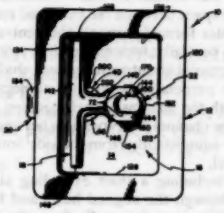
1. A key ring type device comprising a ring with jointed helicoidal turns that can be drawn apart along a direction parallel to the axis of the turns so as to allow the insertion of the edge of the hook opening of an object such as a key, and an accessory part hanging from this ring to create bulk for the key ring ensemble and to carry inscriptions, said accessory part comprising a tool component portion to be used as a tool to separate the turns of the ring; said component being positioned on said accessory part such that it can be pressed between two turns of said ring to separate said turns, said accessory part further comprising a guard band surrounding said tool component, said guard band 14 enclosing the tool component and being further adapted to support said ring on said accessory part.

4,706,478

ROTARY HANDLE OPERATED DOOR LOCK

Jye P. Swan, Brunswick Hills; Lee S. Weinerman, Medina, and Steven A. Mayo, Akron, all of Ohio, assignors to The Eastern Company, Strongsville, Ohio

Filed Apr. 11, 1986, Ser. No. 850,981
Int. Cl.[4] B60R *25/02*
U.S. Cl. 70—208 **7 Claims**



1. A rotary handle operated, flush mountable door lock, comprising:

(a) housing means including:

(i) a pan-shaped housing member formed as a sheet metal stamping and having:

(1) a substantially flat back wall with opposite sides thereof defining front and rear faces that extend substantially parallel to each other in spaced planes that are separated by a distance equal to the thickness of the back wall;

(2) side wall means formed integrally with the back wall for extending in an uninterrupted and continuous manner about and perimetrically bordering the back wall, and for cooperating with the back wall to define a forwardly facing recess that extends forwardly from the front face of the back wall;

(3) mounting flange means including a substantially flat mounting flange that is formed integrally with the side wall means for extending in an uninterrupted and continuous manner about and perimetrically bordering the side wall means, and that extends in a plane which parallels the back wall and which defines a front boundary of the forwardly facing recess;

(ii) an elongate guide member having:

(1) a pair of substantially flat end portions that extend in a common first plane;

(2) a substantially flat central portion located between the end portions and extending in a second plane that is substantially parallel to but spaced from the first plane;

(3) a pair of substantially flat connecting portions that border opposed edge of the central portion, that extend in spaced parallel planes which intersect the first and second planes and which are substantially perpendicular to first and second planes, and that are formed integrally with the end portions and the central portion, whereby each of the connecting portions functions to

connect a separate one of the end portions to a separate one or two opposed edges of the central portion;

(iii) the guide member being rigidly connected to the housing member as by rigidly connecting the spaced end portions to the rear face of the back wall, with the guide member being positioned relative to the housing member such that the common plane of the end portions extends along the rear face of the housing member in parallel relationship thereto, with the central portion of the guide member extending in spaced parallel relationship with a substantially centrally located portion of the back wall, and with the connecting portions cooperating with the central portion of the guide member and with the centrally located portion of the back wall of the housing member to define a guide channel that extends along and in direct contact with the rear face of the back wall to define a guide path of movement that parallels each of the back wall, the central portion and the connecting portions, with the connecting portions defining opposed side boundaries of the guide channel, with the back wall and the central portion defining opposed front and rear boundaries of the guide channel, and with the guide channel being of substantially uniform, generally rectangular cross section having a width that is determined by the spasce between the side boundaries and a thickness that is determined by the space between the front and rear boundaries;

(iv) aligned holes formed through the central portion and through the centrally located portion, with the aligned holes being coaxial about an imaginary shaft rotation axis that extends perpendicularly with respect to the back wall, and with the imaginary shaft rotation axis intersecting the guide channel at a location between and spaced substantially equidistantly from the side boundaries of the guide channel;

(b) shaft means including a shaft extending along the shaft rotation axis through the aligned holes and having a front end region that projects forwardly from the back wall and into the recess, and having a rear end region that projects rearwardly from the back wall, the shaft being rotatable about the shaft rotation axis relative to the housing between latched and unlatched positions;

(c) operating handle mens including an operating handle connected to the front end region of the shaft and being rotatable with the shaft about the shaft rotation axis between the latched and unlatched positions;

(d) a latching arm connected to the rear end region of the shaft and being rotatable therewith about the shaft rotation axis between the latched and unlatched positions;

(e) receiving formation means provided on the shaft at a location wherein said the shaft intersects with the guide channel, with the receiving formation means including a pair of flat surface portions formed on opposed sides of the shaft, with the flat surface portions extending substantially parallel to each other and parallel to the shaft rotation axis, and with the flat surface portions being spaced substantially equidistantly from the shaft rotation axis and at a predetermined distance from each other;

(f) key operated locking means connected to the housing for selectively restraining the handle, the shaft and the latching arm from rotating about the shaft rotation axis when the handle, the shaft and the latching arm are in their latched and unlatched positions, the key operated ocking means including:

(i) control means including an elongated, one-piece control member that has at least a mounting portion that extends into the guide channel and that is slidably connected to the housing means by virtue of the mounting portion of the control means being dimensioned such that its cross section if of generally rectangular form having width and thickness dimensions that are only slightly less than the width and thickness of the guide channel, whereby the control member is mounted on the housing means for smooth sliding movement relative thereto along a guide path of movement that is defined by the guide channel, with the control member being movable along the guide path of movement between locked and unlocked positions, and with such movement being guided by direct engagement of the control member with each of the back wall of the housing, the central portion of the guide member and the connecting portions of the guide member;

(ii) locking formation means defined by the control means in the form of an elongate keyhole shaped slot formed through the control member and having the shaft extending therethrough, with the length of the slot paralleling the guide path of movement, with the slot having relatively small end region at one end thereof and a relatively large end region at the other end thereof, with the relatively small end region being defined in part by a pair of flat side wall portions that extend in parallel relationship to the guide path of movement and along opppsed sides of the keyhole shaped slot at substantially equal distances from the axis of shaft rotation and being spaced from each other at a distance that is selected to permit the flat surface portions of the shaft to be closely received therebetween when the control member is in its locked position to prevent shaft rotation about the shaft rotation axis, and with the relatively large end region of the slot having an enlarged circular formation of suffificent size to loosely surround the shaft and to thereby readily permit rotation of the shaft about the shaft rotation axis when the control member is in its unlocked position;

(ii) key cylinder means for receiving a suitably configured key and having rotatable stem means for rotation relative to the housing in response to rotation of a suitable configured key in the key cylinder means; and,

(iv) cam means connected to the rotatable stem means for movement therewith and for drivingly engaging the control means for selectively moving the control member between its locked and unlocked positions, and for cooperating with the control means to selectively retain the control means in its locked and unlocked positions;

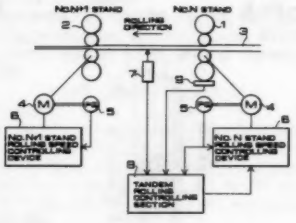
(g) the locking formation means and the receiving formation means being operable to engage when the control member has been moved to its locked position to prevent rotation of the handle, the latching arm and the shaft relative to the housing, and being operable to disengage when the control member has been moved to its unlocked position to permit rotation of the handle, the latching arm and the shaft relative to the housing about the shaft rotation axis.

4,706,479

TANDEM ROLLING CONTROL SYSTEM

Yoshiharu Tominaga, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 14, 1984, Ser. No. 640,744
Claims priority, application Japan, Nov. 7, 1983, 58-208859
Int. Cl.[4] B21B *37/06, 37/08*
U.S. Cl. 72—8 **1 Claim**



1. A tandem rolling control system for controlling a tandem rolling mill which includes two neighboring rolling stands through which a material to be rolled passes sucessively, each of said rolling stands including a pair of rolls and an electric

motor for driving one of said pair of rolls, said control system comprising:

a rotational speed detector connected to each motor for detecting a rotational speed of each electric motor and for outputting a corresponding rotational speed signal;

a rolling load detector for detecting a rolling load acting upon the upstream pair of rolls and for outputting a corresponding rolling load signal;

a speed detecting device for detecting a travelling speed of the material to be rolled between the two neighboring rolling stands and for outputting a corresponding travelling speed signal;

a rolling speed controlling device for controlling a rotational speed of each electric motor for driving said pairs of rolls, the downstream rolling speed controlling device being responsive to the rotational speed signal from the rotational speed detector of the downsteam stand; and

a tandem rolling controlling section responsive to the rotational speed signal of the rotational speed detector of the upstream stand, the rolling load signal and the travelling speed signal for effecting a calculation required to maintain to a proper value the rotational speed of the electric motor of the upstream stand to maintain proper tension of the material between said two neighboring rolling stands and for delivering a resultant value of the calculation to said rolling speed controlling device of the upstream stand as a speed instruction;

said tandem rolling controlling section including means for storing (1) a value of a travelling speed signal representative of the travelling speed of the material to be rolled which is fed out from the upstream one of said two neighboring rolling stands after it has been bit into by said upstream one of said neighboring rolling stands and (2) a rotational speed signal of said electric motor of said upstream one of said neighboring rolling stands, and means for effecting a predetermined calculation after the material to be rolled has been bit successively into by the two neighboring rolling stands in accordance with the equation

$$N = V \cdot No / Vo \cdot f(F)$$

wherein N is the proper rotational speed of the upstream motor,

V is the travelling speed signal,

Vo is the stored value of travelling speed signal,

No is the stored value of the rotational speed signal, and

f(F) is the detected rolling load signal.

4,706,480

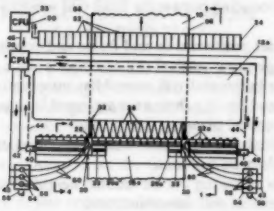
ROLLING MILL COOLING SYSTEM

Joseph D. Svatos, 1707 Windingridge Dr., Richmond, Va. 23229

Continuation of Ser. No. 786,583, Oct. 11, 1985, abandoned. This application Dec. 3, 1986, Ser. No. 938,339

Int. Cl.[4] B21B *37/12, 27/10*

U.S. Cl. 72—17 **12 Claims**



1. A strip rolling mill comprising a pair of cooperating work rolls having parallel axes, spray means for cooling each work roll comprising a row of side-by-side sets of nozzles directed to spray directly against the adjacent roll, means mounting said sets of nozzles in fixed positions, the nozzles in each row being adjusted to spray side-by-side fixed portions of most of the length of the adjacent roll, means to selectively activate the nozzles in each row to adjust their combined spray width and thereby approximate but not exceed the varying widths of successive strips to be rolled in the mill, and means to improve said approximation comprising additional sets of other nozzles, each additional set being near and offset from a side of a row of said fixed sets of nozzles, and each being adjusted to spray directly against the same roll sprayed by the nearby side of a row of fixed set of nozzles and to spray against a narrower portion of the length of the same roll than any portion of said roll sprayed by any of the fixed nozzle sets which are nearby in the path of movement of the additional nozzle set, means mounting each additional nozzle set to move laterally substantially parallel to said roll axes and in offset relation to and along at least the outer part of the adjacent side of a row of fixed nozzle sets directed at the same roll, and means operable to so laterally move each of said additional nozzle sets and thereby enable them to be moved to spray the outermost portions of the roll in contact with the strip when the widest selection of the fixed nozzles within the strip width is less than the strip width.

4,706,481

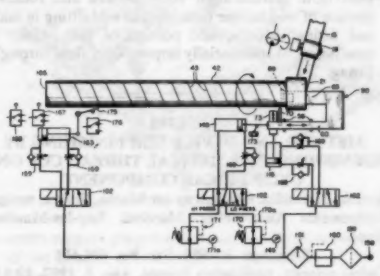
APPARATUS FOR CUTTING HOLLOW PIPE

Wilhelmus P. H. Castricum, Rolling Meadows, Ill., assignor to Spiro America Inc., Wheeling, Ill.

Continuation-in-part of Ser. No. 746,237, Jun. 18, 1985, abandoned. This application Jun. 17, 1986, Ser. No. 876,286

Int. Cl.[4] B21C *37/12*

U.S. Cl. 72—49 **22 Claims**



1. For use with a machine for producing spiral seamed hollow pipe from a metal strip including drive means for feeding the strip through the machine, means for forming the strip into a spiral cylinder so that the outer edges of the strip are adjacent each other, and means for joining the adjacent edges to produce a spiral seamed pipe, and the pipe moving in an axial direction while it rotates, a pipe cutting apparatus comprising:

a first rotatable knife blade mounted for positioning inside the pipe and adapted to be rotationally driven by contact with the moving pipe;

a second rotatable knife blade mounting for positioning outside of the pipe and adapted to be rotationally driven by contact with the moving pipe;

means for moving the second blade between a first position where the pipe can move freely by the second blade and a second position where the first and second knife blades will overlap and puncture the pipe; and

guide means for allowing the pipe to pull the first and second knife blades in their overlapping, second position with the pipe as the pipe moves in an axial direction, so that the first and second blades cooperate to cut the pipe as it moves axially and rotates between the overlapping first and second blades.

4,706,482

PERMANENTLY-INSTALLED TEST FITTING

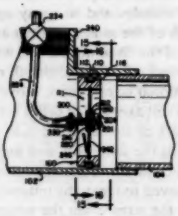
John C. Barber, 3915 Canal Rd., Lake Worth, Fla. 33461

Continuation-in-part of Ser. No. 706,322, Feb. 27, 1985, Pat. No. 4,602,504. This application Jul. 28, 1986, Ser. No. 891,201

The portion of the term of this patent subsequent to Jul. 29, 2003, has been disclaimed.

Int. Cl.[4] G01M *3/04*

U.S. Cl. 73—49.8 **18 Claims**



1. A test fitting for use in pressure testing pipe and fitting systems during the installation thereof, comprising:

a water impermeable barrier adapted to block fluid flow through said pipe and fitting system;

means for sealably and permanently installing said barrier into a fitting in said pipe and fitting systems, said means for installing comprising elastic, fluid resistant means about the periphery of the barrier adapted to press outwardly from the barrier and seal the barrier against an interior wall of said fitting; and,

frangible, removable seal means in said barrier permitting fluid flow therethrough when broken and removed, a portion of said barrier remaining in said fitting in said pipe and fitting systems, said portion of said barrier being insufficient to substantially impede fluid flow through said fitting.

4,706,483

METHOD AND DEVICE FOR FINISHING BY BURNISHING OF A HELICAL THREAD CUT ON A CYLINDRICAL COMPONENT

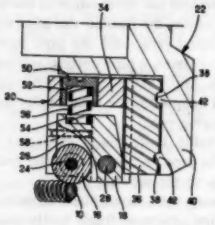
Hubert A. Perraudin, Champigny sur Marne, France, assignor to Equipements Automobiles Marchal, Issy-les-Moulineaux, France

Filed Apr. 3, 1984, Ser. No. 604,654

Claims priority, application France, Aug. 3, 1982, 82 13574

Int. Cl.[4] B21H *3/02*

U.S. Cl. 72—84 **10 Claims**



1. A method of finishing by burnishing, a helical thread (12,14) cut on a cylindrical component (10), in which a portion of corresponding profile of a burnishing wheel (16) is inserted into the helical thread (12,14), and the component (10) and the wheel (16) are clamped together, wherein one of the above components is caused to rotate about its own axis and causes the other component to rotate about its own axis by means of the engagement of the helical thread (12,14) and the corresponding profiled portion, said method comprising providing a burnishing wheel (16) whose periphery is provided, in section, with a single profile corresponding to the shape of the groove between adjacent thread crests, the wheel (16) is mounted such that it rotates freely on a support (18,68) about an axis which is inclined with respect to the axis of the component (10), the component (10) is caused to rotate about its own axis, the wheel (16) is resiliently pressed against a first end of the component (10), the support (18,68) of the wheel (16) is displaced parallel to the axis of the component (10) such that the periphery of the wheel (16) is caused to rotate by the component (10) and is displaced along the groove of the helical thread (12,14) by the component the wheel (16) is spaced from the component (10) at the other end of the thread (12,14) the support (18,68) of the wheel is then displaced to return the wheel to the first end to begin a new cycle of resilient application of the wheel (16) against the component (10), and displacement, and the cycle is repeated at least several times to obtain the required finish.

4,706,484

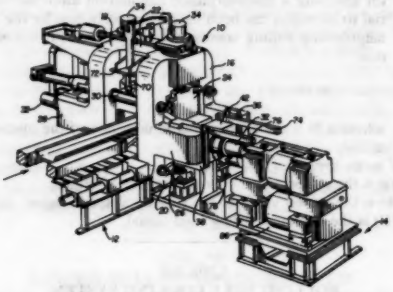
UNIVERSAL ROLLING MILL

Robert W. Dittmar, and Winfried Schmiedberg, both of Pittsburgh, Pa., assignors to United Engineering Rolling Mills, Inc., Pittsburgh, Pa.

Filed Jul. 28, 1986, Ser. No. 889,741

Int. Cl.[4] B21B *13/08, 31/08*

U.S. Cl. 72—225 **7 Claims**



1. A universal rolling mill for rolling shaped sections, such as beams, rails, by a roll set and having a drive side and an operating side, comprising:

at least an upright vertical housing having a window;

a generally horizontal frame supported in and having portions extending outwardly from said window of said housing;

said roll set positioned in said frame and consisting of a pair of cooperative vertical roll assemblies and a pair of cooperative horizontal roll assemblies cooperating with each other and having their axes arranged in a generally common vertical plane;

said vertical roll assemblies being supported at least in part by said frame portions;

means for adjusting the elevational height of said frame and said vertical roll assemblies; and

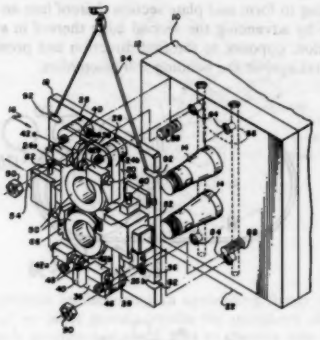
one of said frame portions located on said operating side taking the form of a removable member, including means for securing and detaching said removable member to and from said frame for easy removal and insertion of said roll set to and from the mill.

4,706,485

CARRIER MODULE

Martin Gilvar, Oakham; Harold E. Woodrow, Northboro, and Camille S. Nasrah, Worcester, all of Mass., assignors to Morgan Construction Company, Worcester, Mass.

Filed Dec. 15, 1986, Ser. No. 941,324
Int. Cl.[4] B21B *27/10, 31/08, 39/16*
U.S. Cl. 72—239 **10 Claims**



1. In a rolling mill, a carrier module for the work rolls and guides of a cantilevered roll stand, said mill stand having a housing with externally protruding roll shafts on which the work rolls are removably secured on opposite sides of a mill pass line, with the guides serving to direct a product along the mill pass line between the work rolls, said carrier module comprising: a module plate having a roll shaft opening generally bisected by a module reference line; roll engaging arms mounted on said module plate on opposite sides of said reference line, said arms being adjustable between closed positions engaging and temporarily locating the work rolls on opposite sides of said reference line and in alignment with said roll shaft opening, and open positions retracted from said closed positions; support means for detachably securing the guides to said module plate in alignment with said module reference line; and mounting means for detachably securing said module plate to said housing with said reference line aligned concentrically with the mill pass line and with said roll shafts protruding through said roll shaft opening and the work rolls engaged and temporarily located by said arms, whereupon adjustment of said arms to their open positions will cause said arms to move away from said work rolls, thereby enabling said work rolls to be removably secured to their respective roll shafts.

4,706,486

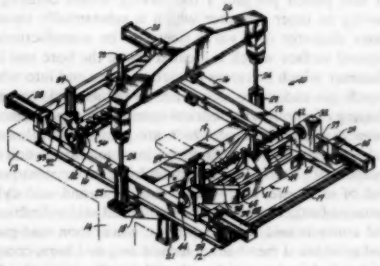
JAW ASSEMBLY FOR STRETCH PRESS

Kwok-Ning S. Kan, Alhambra, Calif., assignor to L & F Industries, Huntington Park, Calif.

Filed Feb. 3, 1986, Ser. No. 825,332
Int. Cl.[4] B21D *25/00*
U.S. Cl. 72—302 **26 Claims**

1. A jaw assembly for a stretch forming press comprising:
a jaw frame comprising a horizontally elongated front wall having a pair of generally horizontal side slots spaced apart on separate sides of the midpoint of the front wall the slots being fixed relative to one another;
a flexible jaw mounted on the front wall of the jaw frame comprising:
a plurality of jaw segments aligned in a row;
hinge means pivotally connecting adjacent jaw segments together;
a pair of side support pins extending rearwardly from the jaw at positions laterally spaced apart from and on separate sides of the midpoint of the jaw, each side support pin extending through a side slot of the jaw frame; and
means for slidably and rotatably securing the side support pins in the side slots;
means for raising and lowering the center of the flexible and jaw relative to the jaw frame thereby causing said side support pins to rotate and slide within said slots, and
means for mounting the jaw assembly on a stretch forming press.

17. A stretch forming press comprising:
a pair of laterally spaced-apart jaw carriages;
a jaw assembly extending between and rotatably mounted on the jaw carriages comprising:
a jaw frame comprising:
a horizontally elongated front wall having a generally vertical center slot and a generally horizontal side slot on each side of the center slot, the side slots being at about the same elevation;
an end wall extending forwardly from each lateral end of the front wall; and
a pair of generally coaxial horizontal trunnions, each trunnion extending laterally outwardly from a separate end wall and rotatably engaged to the jaw carriages;
a flexible jaw mounted on the front wall of the jaw frame comprising:
a plurality of jaw segments aligned in a row;
hinge means pivotally connecting adjacent jaw segments together;



a center support pin extending rearwardly from the center of the flexible jaw through the center slot of the jaw frame;
means for slidably and rotatably securing the center support pin in the center slot;
a pair of side support pins extending rearwardly from the jaw at locations laterally spaced apart from and on separate side slots of the center support pin, each side support pin extending through a side slot of the jaw frame; and
means for slidably and rotatably securing the side support pins in the side slots;
means for raising and lowering the center support pin along at least a portion of the length of the center slot.

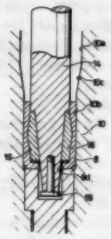
20. A stretch forming press as claimed in claim **17** wherein the means for raising and lowering the center support pin comprises:
a center support pin carriage slidably mounted on the jaw frame at a position rearward of the afforded slidable vertical movement adjacent the length of the center slot, said center support pin carriage rotatably engaging the center support pin; and
a hydraulic cylinder mounted on the jaw frame at a position above the center support pin carriage, the piston rod of the hydraulic cylinder extending downwardly to the center support pin carriage and being connected thereto.

4,706,487

METHOD OF MANUFACTURING A VALVE SLEEVE

Masaaki Bandou, Sakado; Masao Sugita, Higashimatsuyama, and Takachi Marumo, Maebashi, all of Japan, assignors to Jidosha Kiki Co., Ltd., Tokyo, Japan

Filed Jun. 2, 1986, Ser. No. 870,200
Claims priority, application Japan, Jun. 3, 1985, 60-119975
Int. Cl.[4] B21K *1/20*
U.S. Cl. 72—355 **8 Claims**



1. A method of manufacturing a valve sleeve having a plurality of axial grooves formed in the internal surface of a hollow cylindrical material and which are closed at their lengthwise ends utilizing a punch pin having plural longitudinally extending guide means thereon each supporting a punch member for movement along the length of said guide means relative to said punch pin and a die having means defining a bore having an inner diameter which is substantially equal to the outer diameter of a valve sleeve to be manufactured and a tapered surface which is located above the bore and having a diameter which increases toward an open end into which said punch pin and valve sleeve are to be inserted, comprising a shaping of a hollow cylindrical member having an inner and an outer diameter, both of which are greater than those of said valve sleeve to be manufactured, inserting said punch into said cylindrical material and said cylindrical material into said open end of said bore, urging said punch pin and said cylindrical material further into said open end until said cylindrical material contacts said tapered surface whereupon said punch pin and cylindrical member are moved into said bore, compressing said cylindrical material with said punch pin disposed therein from the radial outside thereof, moving said punch members radially outwardly of said punch pin and said guide means in response to an insertion of said punch pin and said cylindrical member further into said bore to cause said punch pin and said radially outwardly projecting punch members to bear against the internal surface of the cylindrical member, said punch members thereby forming a plurality of axial grooves on the inside wall surface of said cylindrical member.

4,706,488

METHOD OF ROLL FORMING CYLINDRICAL PIPE

Calvin C. Williamson, Napa, Calif., assignor to Kaiser Steel Corporation, Fontana, Calif.

Division of Ser. No. 753,327, Jul. 9, 1985, Pat. No. 4,628,721, which is a division of Ser. No. 610,707, May 16, 1984, Pat. No. 4,606,208. This application Nov. 1, 1985, Ser. No. 794,152
Int. Cl.[4] B21D *5/14*
U.S. Cl. 72—370 **6 Claims**

1. A method of forming a generally cylindrical section from a generally planar plate section comprising the steps of:

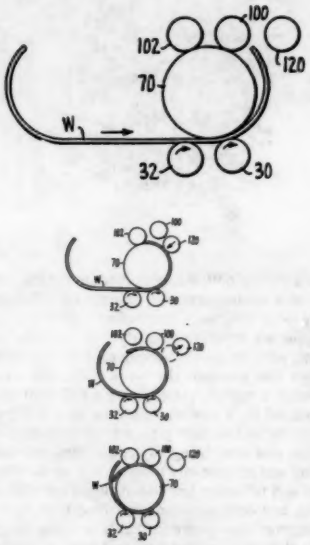
pre-crimping the first and second edges of said plate section to a final desired radius of said cylindrical section,

feeding the first edge of said plate section to a forming mill having an overhead flating mandrel with pressure applying means on one side thereof and bending means on the opposite side including a pair of circumferentially spaced, pivotally mounted rotatably driven bending roll assemblies such that said first edge may pass between the mandrel and the bending means;

clamping said pre-crimped first edge of said plate section between the mandrel and one of said bending roll assemblies,

forming said plate section into an arcuate shape by pressing the mandrel against said bending roll while the plate section advances therebetween in a first direction a given distance;

continuing to form said plate section thereof into an arcuate shape by advancing the second edge thereof in a second direction, opposite to the first direction and pressing the mandrel against the bending roll assemblies;



capturing the second edge with a springback roll and pressing the second edge against the mandrel so that the second edge can pass between the mandrel and the bending roll assembly;

continuing to advance the plate in the second direction while applying pressure to the mandrel until the plate is formed into a generally cylindrical section; and

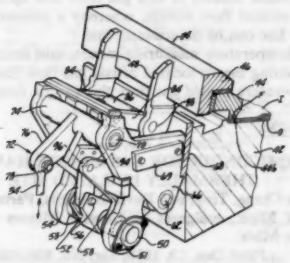
applying pressure to said mandrel at points spaced longitudinally along the mandrel to bend the plate section during forming of the plate section between said mandrel and the pair of bending roll assemblies and to offset deflection of the mandrel and the bending roll assemblies throughout the length of the mandrel so that the plate section is uniformly bent along the length of said plate section to the desired final radius.

4,706,489

SINGLE STATION HEMMING TOOLING

Ernest A. Dacey, Jr., Highland, Mich., assignor to Utica Enterprises, Incorporated, Sterling Heights, Mich.

Filed Dec. 5, 1985, Ser. No. 805,953
Int. Cl.[4] B21D *5/00, 39/02*
U.S. Cl. 72—450 **37 Claims**



1. Apparatus for hemming an upstanding flange at the periphery of an outer part to overlie the periphery of an inner part which overlies said outer part to thereby join the outer part to the inner part, said apparatus comprising:

means for supporting and holding said outer part and said inner part in spaced relationship to each other;

a tool element having a flange contact surface, said tool element being spaced a first predetermined distance from said supporting and holding means and said upstanding flange;

oscillatable cam means having a first portion pivotally mounted to said supporting and holding means, said oscillatable cam means further having an end portion extending in a direction away from said first portion;

pivoted arm means mounted to said tool element and located adjacent said oscillatable cam means for cooperation therewith, said pivoted arm means supporting said tool element for pivoting movement about a first pivot axis, said pivoting movement being concurrent with a first predetermined rotary movement of said oscillatable cam means, said pivoting movement about said first pivot axis further moving said tool element along a first substantially arcuate path in a direction towards said upstanding flange and along a plane that extends generally transversely of said upstanding flange to perform form a first stage hemming of said upstanding flange, whereby said pivoted arm means supporting said tool element is moved by said rotary movement of said oscillatable cam means towards said upstanding flange in a substantially arcuate path to fold over said upstanding flange of said outer part from an upright position to a position approximately midway between said upright position and a final stage hemming position;

oscillatable eccentric means interposed said oscillatable cam means and said pivoted arm means, said oscillatable eccentric means cooperating with said oscillatable cam means concurrent with a second predetermined rotary movement of said oscillatable cam means to move said pivoted arm means supporting said tool element above said upstanding flange along a second substantially contoured path to lift said tool element above said upstanding flange after said first stage hemming of said flange;

said oscillatable eccentric means concurrent with a third predetermined rotary movement of said oscillatable cam means cooperating to move said pivoted arm means supporting said tool element for pivoting movement along a third substantially contoured path to collapse said upstanding flange to a final stage hemming of said upstanding flange after said tool element has been lifted above said upstanding flange; reciprocable actuator means attached to said first portion of said oscillatable cam means, said reciprocable actuator means imparting oscillation to said oscillatable cam means and to said oscillatable eccentric means; and

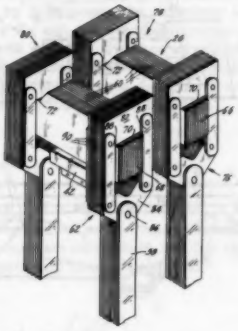
means for reciprocating said reciprocable actuator means.

4,706,490

FORGING PRESS WITH YOKE DESIGN FOR ATTACHING TIE-RODS TO CROSSHEADS

Alexander Zeitlin, White Plains; Jack Brayman, Staten Island, and Adam Zandel, Forest Hills, all of N.Y., assignors to Press Technology Corp., White Plains, N.Y.

Filed Jan. 23, 1986, Ser. No. 821,790
Int. Cl.[4] B21J *13/04*
U.S. Cl. 72—455 **13 Claims**



1. A frame for a 50–500 kiloton forging press, comprising:

a load opposing upper and generally horizontally extending crosshead assembly having first and second end regions at opposite longitudinal ends thereof;

a load opposing lower crosshead assembly having its respective first and second end regions, said lower crosshead assembly being spaced from, parallel to, and generally coextensive with said upper crosshead assembly;

a respective yoke shaped coupling disposed at each one of said end regions of said upper and lower crosshead assemblies, each said respective yoke shaped coupling including a top member, a bottom member and link plates, said top and bottom members and link plates being interconnected to form a coupling enclosure which fits around the end region; and

first and second tie-rod assemblies for completing said forging press frame, said first tie-rod assembly extending generally in a vertical direction from said first end region of said upper crosshead assembly to said first end region of said lower crosshead assembly, said second tie-rod assembly extending between said second end regions of said crosshead assemblies, each of said tie-rod assemblies having respective first and second longitudinal ends and each said longitudinal end being pivotably connected to a respective one of said bottom members of said yoke coupling which is disposed adjacent thereto.

4,706,491

PROCESS AND APPARATUS FOR PRECISION FOLDING OF SHEET METAL

Franco Sartorio, Turin, Italy, assignor to Prima Industrie, S.p.A., Turin, Italy

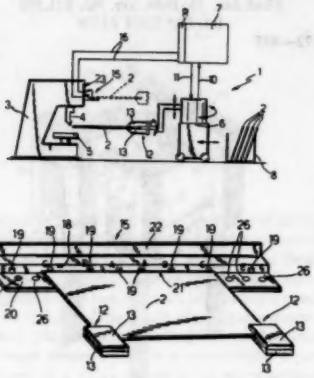
Filed Jul. 1, 1986, Ser. No. 880,704
Claims priority, application Italy, Jul. 15, 1985, 67647 A/85
Int. Cl.[4] B21D *11/22*
U.S. Cl. 72—461 **10 Claims**

1. A process for effecting automatic precision folding of

metal sheets by means of a robotised numerically controlled manipulator device (6) and a folding press (3), characterised by the fact that it comprises the following steps:

gripping of a metal sheet (2) by the said manipulator device (6);

positioning the said metal sheet (2), by means of the said manipulator device (6) against a fixed abutment shoulder (18) positioned in front of the said folding press (3) parallel to a blade (4) thereof and at a known and relatively small distance from the said blade (4);



checking the alignment of a front edge (21) of the said metal sheet (2) with the said abutment shoulder (18) and possible correction of the position of the said metal sheet (2) by means of actuation of the said manipulator device (6); and

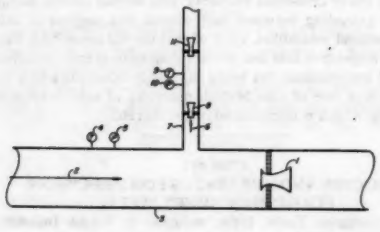
displacement of the said metal sheet (2) into the folding position under the said blade (4) by means of the said manipulator device (6) utilising, as reference coordinates, the coordinates of the said abutment shoulder (18).

4,706,492

METHOD AND APPARATUS FOR DETERMINING REAL GAS EFFECTS IN CRITICAL FLOW NOZZLES

Emrys H. Jones, Jr., Yorba Linda, Calif., and Robert E. Jackson, Cornopolis, Pa., assignors to Chevron Research Company, San Francisco, Calif.

Filed Jun. 16, 1986, Ser. No. 874,731
Int. Cl.[4] G01F *25/00*
U.S. Cl. 73—3 **6 Claims**



1. Apparatus for determining the gas flow rate of a high pressure gas through a critical flow nozzle comprising:

a first critical flow nozzle in a high pressure gas flow line;

a branch line, said branch line upstream of said first critical flow nozzle, of significantly smaller diameter than said gas flow line, and tubularly connected to said gas flow line;

a second critical flow nozzle, said second critical flow nozzle located in said branch line;

a low pressure gas flow measuring means, said low pressure gas measuring means downstream of said second critical flow nozzle in said branch line;

a first pressure measuring means, said first pressure measuring means located in said gas flow line upstream of said first critical flow nozzle, whereby a pressure within the flow line can be determined; and

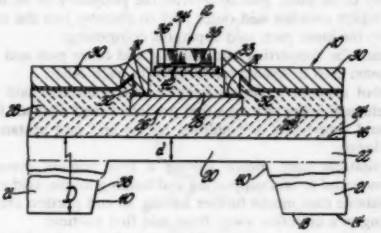
a first temperature measuring means, said first temperature measuring means located in said gas flow line, whereby a temperature in said gas flow line can be determined.

4,706,493

SEMICONDUCTOR GAS SENSOR HAVING THERMALLY ISOLATED SITE

Shih-Chia Chang, Troy, and David B. Hicks, Farmington Hills, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Dec. 13, 1985, Ser. No. 808,546
Int. Cl.[4] G01N *27/06*
U.S. Cl. 73—23 **3 Claims**



1. A gas sensor device for detecting a species in an ambient gas and having a localized, thermally isolated gas interaction site, said device comprising

a silicon substrate including a film support region at said gas interaction site and a region adjacent the film support region, said substrate being etchedly recessed opposite the gas interaction site such that the thickness of the film support region is substantially reduced relative to the adjacent region,

an electrically insulative coating overlying the substrate film support region,

a gas sensitive semiconductor thin film supported upon the insulative coating at said gas interaction site and situated for exposure to ambient gas, and

means at the gas interaction site for selectively heating the gas sensitive thin film to a temperature operative for detecting the species, whereby heat flow from the gas interaction site through the substrate is substantially reduced as a result of the reduced thickness of the substrate film support region.

4,706,494

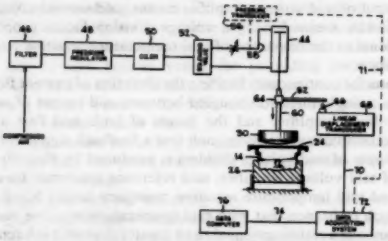
SEAL INTEGRITY TESTING

Sherman H. Creed, and Danny I. Wang, both of Fresno, Calif., assignors to FMC Corporation, Chicago, Ill.

Filed Apr. 25, 1986, Ser. No. 855,979
Int. Cl.[4] G01M *3/26*
U.S. Cl. 73—49.3 **13 Claims**

1. An apparatus for testing the seal integrity of a flexible package containing food products while exposed to ambient atmosphere, said apparatus comprising opposed platens, power means for establishing relative movement between said platens, one of the platens supporting the package, one of said platens

being movable toward the other platen by said power means to raise the internal pressure of the package to an initial predetermined level while the seal remains free of compressive forces created by said platens, and means responsive to said power means for applying an additional predetermined higher level of internal pressure to the package during a selected time interval



for indicating whether compressed fluids within the package flows past the seal, a large pressure differential in said additional higher level of pressure during said timed interval indicating a leaking condition while a small pressure differential at a higher average pressure during said timed interval indicating a properly sealed container.

4,706,495

METHOD AND APPARATUS FOR THE DETERMINATION OF SUBSTANCES DISSOLVED IN A SOLVENT

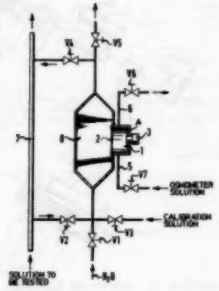
Ernst Steudle, Jülicher Strasse 28, D-5110 Alsdorf; Josef Zilliken, Jülich, and Gerd Böling, Inden-Pier, all of Fed. Rep. of Germany, assignors to Kernforschungsanlage Jülich Gesellschaft mit beschränkter Haftung, Jülich and Ernst Steudle, Alsdorf, both of, Fed. Rep. of Germany

Filed Oct. 31, 1985, Ser. No. 793,565

Claims priority, application Fed. Rep. of Germany, Oct. 31, 1984, 3439765; Jul. 18, 1985, 3525668

Int. Cl.[4] G01N *7/10*

U.S. Cl. 73—64.3 **30 Claims**



29. In a process for the determination of the concentration of substances dissolved in a solvent by means of an osmotic cell with a pressure measurement apparatus for the measurement of the hydrostatic pressure in the osmotic cell, whereby an osmometer solution in the osmotic cell can be brought into communication via a membrane with a solution containing the substances, the improvement to said process comprising the steps of:

selecting an osmotic cell which is as rigid as possible and which has a membrane which exhibits the maximum possible conductivity for the solvent and a sufficient rejection capability for the substances contained in the solution;

introducing a suitable solution into communication with the osmometer solution by means of the membrane;

establishing a working pressure P_O in the osmotic cell, wherein the solution brought into communication with the osmometer solution by means of the membrane is replaced sufficiently rapidly by the solution containing the substances;

determining an established minimum pressure P_{min} in the osmotic cell and a final pressure P_E established in the osmotic cell;

establishing the difference between the working pressure P_O and the final pressure P_E is the osmotic cell, whereby the concentration of an impermeable substance or substances in the solution can be determined using predetermined calibration values; and

determining the concentration of the permeable substance in the solution by determining the difference between the final pressure P_E and the minimum pressure P_{min} after calibration with solutions with known concentrations of the permeable substance, wherein a rate constant k_s for an exponential pressure increase, which occurs after the minimum pressure and a temporal change

$$\left(\frac{d^2P}{dt^2}\right)_{min}$$

of a slope of pressure/time curves in the vicinity of the minimum pressure are determined, and that the final pressure P_E is determined from the equation:

$$k_s \cdot k_w = \frac{1}{P_E - P_{min}} \left(\frac{d^2P}{dt^2}\right)_{min}$$

whereby previously, for the osmotic cell used, the rate constant k_w has been determined using an impermeable osmotic solute.

4,706,496

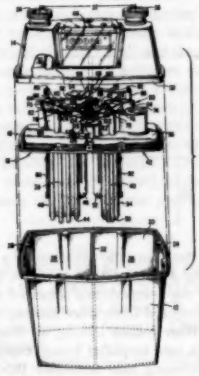
DIAPHRAGM GAS METER

Irwin A. Hicks, Radnor, Pa., assignor to American Meter Company, Philadelphia, Pa.

Filed May 14, 1986, Ser. No. 863,226

Int. Cl.[4] G01F *11/08*

U.S. Cl. 73—268 **5 Claims**



1. A four chamber diaphragm gas meter comprising:

a generally box-like casing having one open side and a planar partition extending from the open side to divide the casing into two substantially equal casing compartments;

a plate-like valve table adapted for attachment to said casing to seal said two casing compartments;

a generally box-like top piece having one open side adapted for attachment to said casing over said valve table to provide a gas inlet chamber, said top piece including a gas inlet connection and a gas outlet connection, the gas inlet connection being disposed over a first of said casing compartments and the gas outlet connection being disposed over the other of said casing compartments;

a pair of measuring chambers mounted on a first side of said valve table, each of said measuring chambers extending from said valve table into a respective one of said casing compartments, each of said measuring chambers including a diaphragm sleeve element fixedly mounted at one end and sealed at the other end, each of said diaphragm sleeve elements being so arranged that its sealed end moves toward and away from its fixed end along a line substantially perpendicular to said partition in response to gas flow through said meter;

a transfer valve assembly mounted on the other side of said valve table and within said gas inlet chamber including a first transfer valve associated with a first of said measuring chambers and a first of said casing compartments and a second transfer valve associated with the other of said measuring chambers and the other of said casing compartments, said first and second transfer valves having valve elements arranged for sliding motion along lines substantially perpendicular to each other and each substantially forty-five degrees to said partition;

means for linking the movable sealed ends of said diaphragm sleeve elements and said sliding valve elements, said linking means including a pair of diaphragm flag rods each coupled to the movable sealed end of a respective diaphragm sleeve element and extending through said valve table at a point in line with a respective transfer valve on the side of said respective transfer valve opposite the intersection of the lines of motion of the sliding valve elements; and

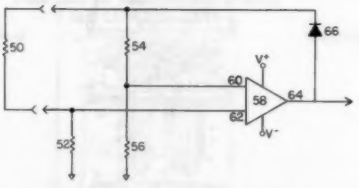
index means coupled to said linking means for indicating the volume of gas flowing through said meter.

4,706,497

LIQUID DETECTION CIRCUIT

Thomas O. Regan, North Aurora, Ill., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 1, 1986, Ser. No. 846,783
Int. Cl.[4] G01F *23/24*
U.S. Cl. 73—295 **8 Claims**



1. A circut for detecting the presence of a liquid in a vessel, said circuit having a temperature sensitive resistance sensing element wherein the temperature sensitive resistance sensing element is self-protected from over heating comprising:

a voltage amplifier means having an output and first and second inputs, said amplifier being responsive to a voltage difference between said amplifier inputs to produce a voltage at said amplifier output proportional to the voltage difference between said inputs;

a first voltage divider means having an input and an output, said output of said first voltage divider, coupled to said first input of said voltage amplifier means;

a temperature sensitive resistance means whose resistance varies with temperature;

a reference resistance means coupled in series with said temperature sensitive resistance means thereby forming a second voltage divider means having an input and an output, said second voltage divider means coupled in parallel with said first voltage divider means, said output of said second voltage divider coupled to said second input of said voltage amplifier means; said second voltage divider means having a voltage division factor proportional to the resistance of said temperature sensitive resistance;

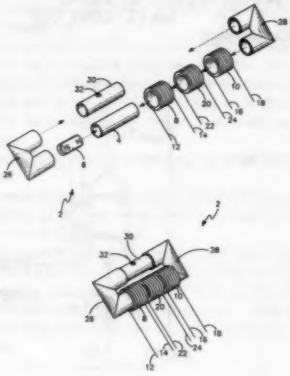
means for continuously limiting the direction of current flow to a single direction coupled between said output of said voltage amplifier and the inputs of both said first and second voltage dividers such that a feedback signal to the inputs of said voltage dividers is produced by the output of said voltage amplifier, said reference resistance means and said temperature sensitive resistance means being of such resistance that with said temperature sensitive resistance at a resistance equal to or greater than said reference resistance, the output of said voltage amplifier means is at a reference potential for said circuit, such that the voltage division factor of said second voltage divider causes a reduction of the output of said voltage amplifier when the resistance said temperature sensitive resistance becomes less than said reference resistance whereby said temperature sensitive resistance is self-protected from overheating.

4,706,498

APPARATUS AND METHOD FOR MEASURING MOVEMENT

Charles L. Nemnich, Longmont, and Charles D. Hoyt, Northglenn, both of Colo., assignors to Ferrotec, Inc., Broomfield, Colo.

Filed Sep. 23, 1985, Ser. No. 779,284
Int. Cl.[4] G01P *15/13*
U.S. Cl. 73—516 R **15 Claims**



1. A measuring appartus comprising:

a hollow vessel having an inner surface with a predetermined cross-sectional configuration;

a one piece solid mass comprising a permanent magnet and having an outer surface with a cross-sectional configuration substantially the same as said cross-sectional configuration of said hollow vessel and located within said hollow vessel;

said cross-sectional configuration of said one piece solid mass having an area slightly less than the area of said cross-sectional configuration of said hollow vessel;

friction reducing means comprising a coating of a friction

reducing material completely covering said outer surface of said one piece solid mass and united thereto for movement therewith and said coating being in complete surface contact with adjacent portions of said inner surface of said hollow vessel for permitting substantially friction free movement of said one piece solid mass in said hollow vessel;

resistance reducing means for reducing any resistance to movement of said one piece solid mass in said hollow vessel comprising atmospheric equalization means exterior of said hollow vessel for providing atmospheric equalization from one side of said one piece solid mass in said hollow vessel to the other side of said one piece solid mass in said hollow vessel;

electrical means for acting on said one piece solid mass to locate said one piece solid mass at a null position in said hollow cylinder;

detecting means for detecting any relative movement between said hollow vessel and said one piece solid mass in response to a force applied to said hollow vessel so that said one piece solid mass is not located at said null position; and

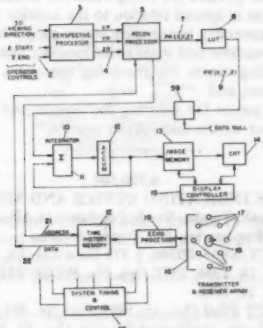
measuring means for measuring said relative movement and for producing and exerting an equal force on said one piece solid mass in a direction opposite to the direction of said relative movement.

4,706,499

SINGLE PULSE IMAGING DEVICE USING HUYGENS WAVELET RECONSTRUCTION

Forrest L. Anderson, P.O. Box 1400, Bernalillo, N. Mex. 87004

Filed May 2, 1987, Ser. No. 858,696
Int. Cl.[4] G01N *29/04*
U.S. Cl. 73—625 **12 Claims**



SYSTEM BLOCK DIAGRAM

1. A means for creating an image of a three dimensional volume containing objects utilizing a device comprising:

(a) A means for transmitting a single pulse of energy which will propagate through a wide angular volume uniformly;

(b) A means for detecting echoes caused by points, on the objects in the three dimensional volume, in the path of propagation of the single pulse of energy, having three or more sparsely spaced receiver elements;

(c) A means for successively sampling echoes, caused by objects in the path of the propagating pulse, received at each receiver element, as a function of time;

(d) A means for storing the successive samples wherein there is created a time history of echoes;

(e) A means for selecting samples from the time history and combining them so as to reconstruct points within images of objects in the path of the single pulse of energy comprising:

(aa) A means for determining each total distance (RPE+RPT) from each receiver element to the reconstructon point, on or within an object, and back to the transmitter;

(bb) A means for using each total distance as an address for the time history memory to select an echo sample for each receiver element;

(cc) A means for combining the selected echo samples so as to reconstruct an image of the point;

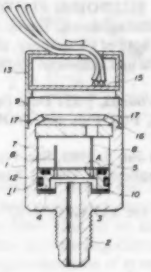
(dd) A means for repeating steps (aa) through (cc) for each point in the three dimensional volume so as to reconstruct an image of objects in the volume.

4,706,500

PRESSURE RESPONSIVE SWITCH

Kenji Hattori, Tochigi, and Etsuo Fujii, Saitama, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 24, 1986, Ser. No. 832,827
Claims priority, application Japan, Feb. 22, 1985, 60-35027; Feb. 22, 1985, 60-35028
Int. Cl.[4] G01L *7/08, 9/10*
U.S. Cl. 73—728 **9 Claims**



4. A pressure responsive switch comprising a case with a cylindrical chamber with a cylindrical wall and a pressure fluid opening at a first end of the cylindrical chamber, an electrical pickup coil means mounted in the case at a second end of the cylindrical chamber, an orifice plate slidably mounted in the case at the first end of said cylindrical chamber and having first sealing means for producing a sliding sealed relationships between the cylindrical chamber wall and the orifice plate, an amorphous diaphragm positioned between said orifice plate and said electrical pickup coil means, second sealing means positioned between said amorphous diaphragm and said orifice plate inwardly from said cylindrical chamber wall, and means for communicating pressure from the opening in the first end of the cylindrical chamber to between the amorphous diaphragm and orifice plate inwardly of said second sealing means for exerting a pressure on the electrical pickup means.

4,706,501

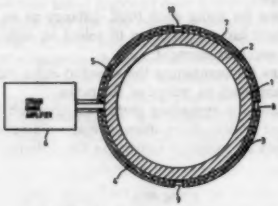
DETECTION OF STEP CHARGES OF PRESSURE IN VESSELS AND APPARATUS THEREFOR

Peter Atkinson, Great Ayton, and Bernard D. Allan, Thornaby, both of England, assignors to Imperial Chemical Industries PLC, London, England

Filed Nov. 9, 1981, Ser. No. 319,674
Claims priority, application United Kingdom, Nov. 21, 1980, 8037400; Mar. 19, 1981, 8108708; Sep. 9, 1981, 8127300
Int. Cl.[4] G01L *7/02*
U.S. Cl. 73—730 **7 Claims**

1. A detector for monitoring step changes of pressure in a vessel which comprises means outside the vessel for detecting

a change in the dimensions of the vessel, said means being mounted on a jubilee clip for clamping around the vessel and said means being surrounded by a potting compound to protect it from moisture and impact; and a filter adapted to pass from



the said means substantially only signals characteristic of dimensional changes resulting from a fall in pressure of the vessel occurring at a minimum rate of 0.005 bars per second which is not followed by a rise in pressure at that minimum rate within 0.05 seconds.

4,706,502

VORTEX SHEDDING FLOWMETER

Julian D. C. Jones, Sittingbourne; David A. Jackson, and Pedram A. Leilabady, both of Canterbury, all of England, assignors to Kent Scientific and Industrial Projects Limited, Canter, England

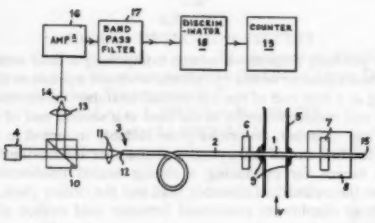
PCT No. PCT/GB85/00302, § 371 Date Feb. 27, 1986, § 102(e) Date Feb. 27, 1986, PCT Pub. No. WO86/00698, PCT Pub. Date Jan. 30, 1986

PCT Filed Jul. 5, 1985, Ser. No. 841,527

Claims priority, application United Kingdom, Jul. 6, 1984, 8417367

Int. Cl.[4] G01F *1/32*

U.S. Cl. 73—861.24 **9 Claims**



1. In a flowmeter for monitoring the vortex shedding frequency of a fluid flow, said flowmeter comprising a tensioned optical fiber sensing element arranged to extend transversely to the fluid flow so as to oscillate in response to vortex shedding, a light source for illuminating the optical fiber, and a photodetector for sensing an output of the fiber sensing element and producing an electrical signal corresponding to the vortex shedding frequency, the improvement wherein said sensing element comprises at least part of a single mode optical fiber forming a signal arm of an interferometer which also includes means for deriving a reference signal from the illuminating light source, said interferometer producing an interference signal which corresponds to the optical phase difference between the signal light beam and the reference signal and which is modulated by oscillation of the sensing element in response to vortex shedding, and said photodetector being arranged to sense the modulated interference signal and produce an electrical signal having a modulation frequency corresponding to the vortex shedding frequency.

4,706,503

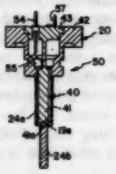
VORTEX METER SENSOR

Boris A. Kamentser, Fountain Valley, Calif., assignor to ITT Corporation, New York, N.Y.

Filed Jan. 30, 1987, Ser. No. 8,977

Int. Cl.[4] G01F *1/32*

U.S. Cl. 73—861.24 **15 Claims**



1. A vortex sensor apparatus for a vortex fluid flowmeter comprising:

(a) an outer beam assembly including

(i) a sensor body means including flange means for securing said assembly within the housing of the flowmeter;

(ii) an outer cantilever beam member affixed to said sensor body, said outer beam member having a first generally tubular portion and a second vane portion integrally attached to and in alignment with said first portion;

(iii) receptacle means in said sensor body including the interior of said tubular portion;

(b) a unitarily formed inner beam assembly having a first and second end including

(i) first end means for securing the first end of said inner beam assembly within said receptacle means;

(ii) a generally rod-shaped inner beam member having a diameter slightly smaller than the inner diameter of said tubular portion for being received within said tubular portion in spaced relation to the interior thereof;

(iii) a generally bar-shaped strain gauge beam member intermediate said inner beam member and said first end securing means for receiving thereon a strain gauge element; and

second end means for securing the second end of said inner beam member within said tubular portion.

4,706,504

FLOW INDICATING DEVICE AND METHOD

Vladimir Jonak, Tumba, Sweden, assignor to Alfa-Laval Marine & Power Engineering AB, Tumba, Sweden

PCT No. PCT/SE85/00396, § 371 Date Jun. 18, 1986, § 102(e) Date Jun. 18, 1986, PCT Pub. No. WO86/02443, PCT Pub. Date Apr. 24, 1986

PCT Filed Oct. 15, 1985, Ser. No. 881,025

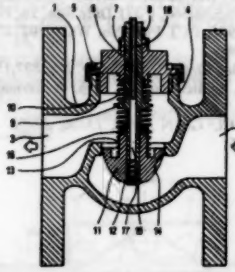
Claims priority, application Sweden, Oct. 19, 1984, 8405226

Int. Cl.[4] G01F *1/26*

U.S. Cl. 73—861.58 **5 Claims**

1. A method of changing the measuring range of a device for indicating changes of a fluid flow, the indicating device comprising a housing (1) with an inlet (2) and an outlet (3) for the fluid, means in the housing (1) forming a passage (14) for said fluid on its way between said inlet (2) and outlet (3), a valve member (11) arranged in the housing (1) and displaceable along a path relative to said passage forming means to successively increase or decrease the through-flow area of the passage (14), a support member (7) connected with the housing (1), and a spring (13), which is supported by the support member (7) and arranged between the latter and the valve member (11) to actuate the valve member (11) to decrease the through-flow area of the passage (14), the valve member (11) being arranged to be moved along said path by the fluid flowing through the passage (14) against the action of said spring (13), said indicating device further comprising indicating means (15, 16) arranged to indicate a certain position of the valve member (11)

relative to the support member (7), part (15) of said indicating means being connected with the support member (7), the method comprising moving the support member (7) relative to the housing (1) in one of the opening and closing directions of



the valve member (11) from a first position, in which the valve member is adapted for a first fluid flow through the indicating device, to a second position in which the valve member is adapted for a different fluid flow through the indicating device.

4,706,505

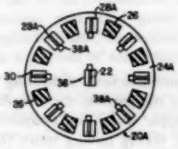
FORCE AND TORQUE SENSOR

Steven M. King, Westboro, Mass., assignor to Barry Wright Corporation, Newton Lower Falls, Mass.

Filed Nov. 22, 1985, Ser. No. 801,114

Int. Cl.[4] G01L *5/16*; H01C *10/12*

U.S. Cl. 73—862.04 **29 Claims**



1. A sensor responsive to and being adapted to sense a force component applied to the sensor along an axis of the sensor, said sensor comprising:

a pair of support members, each made of a relatively rigid material;

means for spacing said support members from one another by a predetermined distance along said axis;

means secured to one of said support members comprising a first plurality of elements, each of said elements of said first plurality being made of a relatively resilient, electrically-conductive material; and

means secured to the other of said support members comprising a second like plurality of said elements, each of said elements of said second plurality being made of a relatively resilient, electrically-conductive material and paired with, in contact with and compressed against a corresponding one of said elements of said first plurality as said force component varies relative to said axis such that the electrical impedance between each element of said first plurality and the corresponding element of said second plurality changes as said component of force changes;

wherein the pairs of said elements of said first and second pluralities are spaced around and radially spaced from said axis, and circumferentially spaced around said axis from one another, and said means for spacing said members from one another includes at least one support element made of a relatively resilient material disposed between and secured to each of said support members.

4,706,506

PICKUP FOR MEASURING FORCES AND TORQUES AND APPLICATION OF SUCH A PICKUP TO A FOLLOWER AND A GRIPPER

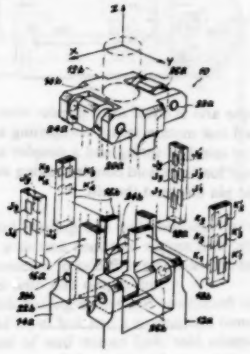
Dominique Lestelle, Montrouge, France, assignor to Commissariat a l'Energie Atomique, France

Filed Oct. 24, 1986, Ser. No. 922,750

Claims priority, application France, Oct. 25, 1985, 85 15886

Int. Cl.[4] G01L *5/16, 1/22*

U.S. Cl. 73—862.04 **12 Claims**



1. A pickup for measuring forces and torques, wherein it comprises two U-shaped parts, each having two measuring branches connected at their base by an intermediate branch, the branches of the same part passing through a plane of symmetry containing a longitudinal axis of symmetry Z, said parts being placed in reverse direction with said planes of symmetry of each part which are orthogonal with respect to one another, whilst their axes of symmetry coincide, the ends of the measuring branches of each of said parts being connected to the intermediate branch of the other part by two cylindrical links, each authorizing a rotation and a translation along the same axis X, Y orthogonal to the axis Z and parallel to the plane of symmetry of said other part, each of the measuring branches being able to deform in said plane of symmetry of the part to which said branch belongs, strain gauges being placed on these measuring branches so as to measure the forces exerted in three directions X, Y and Z and the moments of the torques about directions X and Y.

4,706,507

TORQUE MEASURING DEVICE HAVING DUAL RANGE LOAD CELLS

Severino D'Angelo, Laguna Beach, Calif., assignor to Horiba Instruments Incorporated, Irvine, Calif.

Filed Feb. 21, 1986, Ser. No. 831,987

Int. Cl.[4] G01L *3/00, 1/26*

U.S. Cl. 73—862.08 **17 Claims**

1. A torque measuring device adapted to measure forces exerted on an extending torque arm, comprising:

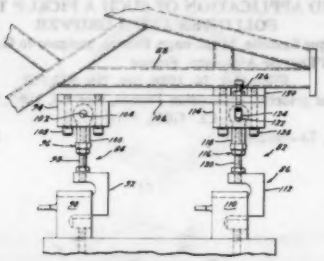
a low range load cell,

a leaf spring coupling said low range load cell to said torque arm,

a high range load cell, and

lost motion means for coupling said high range load cell to said torque arm such that loads exerted by said torque arm are transmitted to said high range load cell only after said leaf spring undergoes a predetermined degree of deflec-

tion whereby loads are transmitted only to said low range load cell when a load applied by said torque arm is below a threshold level, and loads are transmitted to both said low and said high range load cells when a load applied by



said torque arm is equal to or greater than said threshold level; said lost motion means comprising a pin fixed with respect to said leaf spring and a coupler attached to said high range load cell, said coupler having an elongated slot with said pin disposed therein.

4,706,508

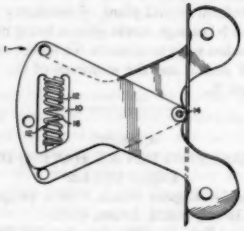
BICYCLE SPOKE TENSIOMETER

Eric A. Hjertberg, and Jon A. Hjertberg, both of Palo Alto, Calif., assignors to Wheelsmith, Inc., Palo Alto, Calif.

Filed Nov. 8, 1985, Ser. No. 796,418

Int. Cl.[4] G01L 5/06

U.S. Cl. 73—862.47 **7 Claims**



1. A tensiometer device comprising, in combination, a pair of support plates facing each other,

each support plate having a lower portion and an upper portion provided with a gripping tab offset horizontally from the vertical centerline of said plate and bent inwardly toward the other plate,

pivot means connecting said plates to permit scissors-like movement of the upper and lower portions of said plates about said pivot means,

spring means positioned to urge the lower portion of said support plates to pivot away from each other.

4,706,509

METHOD OF AND AN APPARATUS FOR ULTRASONIC MEASURING OF THE SOLIDS CONCENTRATION AND PARTICLE SIZE DISTRIBUTION IN A SUSPENSION

Ulrich Riebel, Kronberg, Fed. Rep. of Germany, assignor to Friedrich Loffler, Karlsruhe, Fed. Rep. of Germany

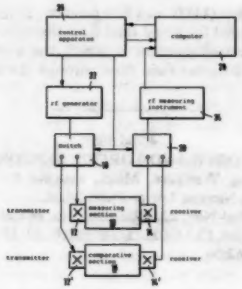
PCT No. PCT/EP85/00560, § 371 Date Jun. 16, 1986, § 102(e) Date Jun. 16, 1986, PCT Pub. No. WO86/02727, PCT Pub. Date May 9, 1986

PCT Filed Oct. 23, 1985, Ser. No. 887,158

Claims priority, application Fed. Rep. of Germany, Oct. 23, 1984, 3438798

Int. Cl.[4] G01N 15/02, 15/06, 29/02

U.S. Cl. 73—865.5 **14 Claims**



1. A method of simultaneously measuring the concentration of solid particles and the particle size distribution in a suspension, wherein ultrasonic waves are coupled into said suspension, said ultrasonic waves having more that one frequency and the absorption of said ultrasonic waves by said solid particles is measured, characterized in that

(a) a plurality of m frequencies (f_j; $1 \leqq j \leqq m$) of said ultrasonic waves are so selected that the wavelengths of said ultrasonic waves of the highest frequency (f_m) approximately corresponds to or is smaller than the diameter x_{min} of the smallest particles to be measured, and that the wavelength of the ultrasonic waves of the smallest frequency (f_1) approximately corresponds to or is greater than the diameter x_{max} of the largest particles to be measured;

(b) the absorption (A_j) of said ultrasonic waves of said suspension is measured at a given frequency (f_j) and expressed by the following equation

$$A_j = \sum_{i=1}^{n} a_{ij} c_i \qquad (I)$$

whereby a_{ij} is the absorption-coefficient at said given frequency f_j of those solid particles whose size lies in the particle size interval Δx_i and c_i is the concentration of the particles of this dimensional interval Δx_i in said suspension, and that

(c) the linear equation-system (I) thus formed is solved in per se known manner with respect to the unknown quantities c_i to provide the particle size distribution.

4,706,510
PROTECTIVE DEVICE FOR GUIDE TRACK BETWEEN TWO RELATIVELY MOVABLE MACHINE PARTS

Ernst Zimmer, Friedberg, Fed. Rep. of Germany, assignor to Kuka Schweissanlagen & Roboter GmbH, Fed. Rep. of Germany

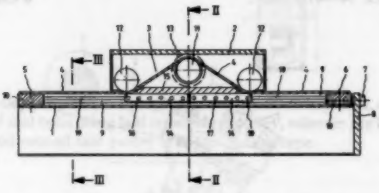
PCT No. PCT/EP85/00266, § 371 Date Jan. 28, 1986, § 102(e) Date Jan. 28, 1986, PCT Pub. No. WO85/05586, PCT Pub. Date Dec. 19, 1985

PCT Filed Jun. 4, 1985, Ser. No. 828,325

Claims priority, application Fed. Rep. of Germany, Jun. 5, 1984, 3420936

Int. Cl.⁴ F16H *19/02;* **G05G** *1/00*

U.S. Cl. 74—89.21 **6 Claims**



1. A device for protecting guide means between first and second machine parts which are mounted to each other for relative movement, comprising the first machine part having a guide channel extending in a longitudinal direction of relative movement between the first and second machine parts, the guide channel being completely closed except for a longitudinal slot extending in a longitudinal direction, a guide track in said guide channel extending in a longitudinal direction, a plurality of guide elements connected to the second machine part and engaged with the guide track for movement of the second machine part in the longitudinal direction with respect to the first machine part, said guide elements extending through said longitudinal slot, the second machine part always covering at least a portion of said longitudinal slot, the first machine part having guide strips on the outside thereof and on opposite sides of the longitudinal slot which extend in the longitudinal direction, a toothed belt having a finite length and opposite ends, one end of said toothed belt being fixed to the first machine part at one longitudinal end of the first machine part and the opposite end of said toothed belt being fixed to the first machined part at an opposite logitudinal end of the first machine part, said toothed belt being engaged over said guide strips on the outside of the first machine part and covering all portions of said longitudinal slot from the outside except for the portion of the longitudinal slot covered by the second machine part so that the longitudinal slot is completely covered by said toothed belt and by the second machine part, a pair of spaced apart tension rollers rotatably mounted to the second machine part at locations spaced in the longitudinal direction for engaging and tensioning said toothed belt, and a toothed drive pinion acting as a deflection roller for engaging said toothed belt, said pinion being mounted for rotation to the second machine part between said tension rollers with rotation of said pinion causing movement of the second machine part on the first machine part, the second machine part having a housing which contains pinion and said tension roller.

4,706,511
HIGH ANGLE LINK HINGE

John C. Houston, Erie, Pa., assignor to American Sterilizer Company, Erie, Pa.

Filed Jan. 27, 1986, Ser. No. 822,370

Int. Cl.⁴ F16H *21/44;* **A61G** *13/00*

U.S. Cl. 74—105 **14 Claims**

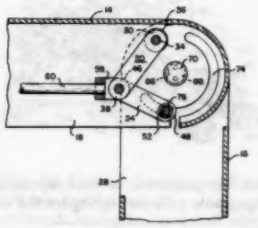
1. In an apparatus having a first member rotatably connected at a joint to a second member, a linkage for transmitting torque comprising:

said second member having two first parallel spaced side walls, each said side wall having access openings;

said first member having two second parallel spaced side walls rotatably mounted outboard of said first sidewalls of said second member;

an input link having one end rotatably mounted to said second member between said first sidewalls and a second end;

means for applying a moment to said input link about said one end of said input link;



an output link having one end rotatably mounted to said joint and a second end, said output link being so operatively connected to said first member that said first member moves with said output link;

a coupler link having a first end connected to said second end of said input link and a second end connected to said second end of said output link, said coupler link being pivotally mounted through said access openings in said second member to said first member;

the length of said input link being greater than the length of said output link so that rotation of said input link about its one end causes said coupler link to rotate said output link about its ones end through a greater angle of rotation than that of said input link.

4,706,512
ELECTRICALLY OPERABLE ACTUATOR

David A. McKernon, and Lawrence A. North, both of Dunstable, England, assignors to Delco Products Overseas Corporation, Detroit, Mich.

Filed May 16, 1985, Ser. No. 734,702

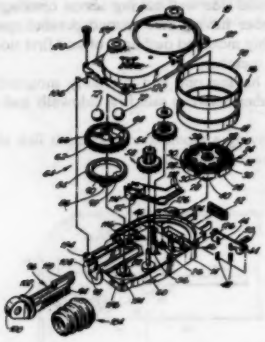
Claims priority, application United Kingdom, May 19, 1984, 8412861

Int. Cl.⁴ F16H *57/00*

U.S. Cl. 74—405 **4 Claims**

1. An electrically-operable actuator for a motor vehicle, which includes a housing, a reversible direct current electric motor, a reduction gear train, a reciprocable member adapted at one end to be coupled with a locking lever of a motor vehicle door latch and clutch means provided between said reversible electric motor and said reciprocable member, characterised in that said clutch means is a rotary load-sensitive releasable coupling within said reduction gear train which disengages said reciprocable member completely from said reversible electric motor at the end of each predetermined motorised movement of said reciprocable member, said rotary clutch having a driving member in the form of a toothed wheel pivotally mounted in said housing and having, on one side thereof, a radially-extending projection engageable with a radially-extending stop means within said housing, and, on the other side thereof, a spring-loaded radially-extending tooth aligned with said radially-extending projection; and a driven member in the form of a disc having, on one side, an output pinion operably associated with the reciprocable member and, on the other side, a depending annular skirt, said annular skirt co-axi-

ally engaging a bearing surface on said other side of said toothed wheel so as to enclose said spring-loaded tooth, there



being a tooth-like projection on said depending annular skirt which is engageable with said spring-loaded tooth.

4,706,513

RACK AND PINION POWER STEERING APPARATUS

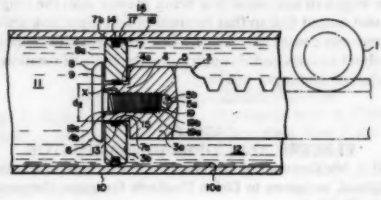
Shinichi Komatsu, Hatano, Japan, assignor to Atsugi Motor Parts Company Limited, Japan

Filed Sep. 12, 1985, Ser. No. 775,444

Claims priority, application Japan, Sep. 13, 1984, 59-139018[U]

Int. Cl.[4] B62D *3/12*

U.S. Cl. 74—422 **5 Claims**



1. A rack and pinion power steering apparatus comprising:

(a) a pinion;

(b) a rack meshing with the pinion, one end of the rack having a base and a boss extending integrally from the base, the boss having a cross-sectional area smaller than a cross-sectional area of the base, the rack defining a hole which extends from an end face of the boss into the base through the boss and which terminates at a blind end in the base, the hole having a non-threaded first segment and a female-threaded second segment, the first segment extending in the boss and lying from the end face of the boss to a preset point axially away from the end face of the boss, the second segment extending from the preset point toward the blind end, a major part of the second segment extending in the base;

(c) a piston loosely fitted to the boss to permit relative movement therebetween; and

(d) a piston mounting bolt having a head and a male-threaded screw extending from the head, the screw extending in the hole, the screw extending into the base through the boss, the male thread of the screw engaging the female thread of the second segment of the hole, the bolt being secured to the rack by engagement between the threads, wherein a major component of a force transmitted between the bolt and the rack passes through the engaged threads in the base;

the bolt head, the rack boss, and the rack base defining a recess receiving a part of the piston.

4,706,514

GEAR SELECTOR FOR MANUAL TRANSMISSION HAVING REVERSE GEAR LOCKOUT

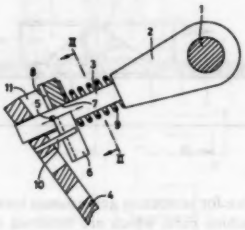
Vinzenz Schmidt, Pulheim, Fed. Rep. of Germany, assignor to Ford Motor Company, Dearborn, Mich.

Filed Nov. 14, 1986, Ser. No. 930,635

Claims priority, application Fed. Rep. of Germany, Dec. 4, 1985, 3542812

Int. Cl.[4] G05G *5/02, 9/12*

U.S. Cl. 74—476 **6 Claims**



1. A gear shift mechanism for preventing inadvertent engagement of reverse gear in a multiple speed ratio manual transmission comprising:

a gate plate having a system of interconnected gear shift slots formed therein defining gear ratio positions in the slots;

a gear selector shaft having a selector finger located within and moveable along the slots of the gate plate;

a pawl rotatably mounted on the selector finger defining first and second perpendicular angular positions with respect to the selector finger;

means for rotating the pawl between said angular positions as the selector finger is moved within said slots;

stop means adapted to be contacted by the pawl when the pawl is in the first angular position and the selector finger is moved toward the reverse drive position and to avoid contact with the pawl when the pawl is in the second angular position.

4,706,515

MULTI-ARTICULATED ROBOT

Kazuyoshi Yasukawa, Nagano, Japan, assignor to Kabushiki Kaisha Sankyo Seiki Seisakusho, Nagano, Japan

Filed Sep. 10, 1986, Ser. No. 905,818

Claims priority, application Japan, Sep. 10, 1985, 200097

Int. Cl.[4] B25J *17/00*; G05G *11/00*

U.S. Cl. 74—479 **5 Claims**

1. A multi-articulated robot comprising:

a base;

a first arm rotatably supported to said base;

a second arm rotatably supported at a forward end of said first arm;

a work shaft provided at a forward end of said second arm;

belts provided below said first arm and said second arm, respectively;

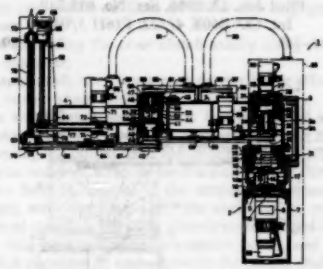
a drive source provided at said base for driving said work shaft;

a hollow shaft fixed to said base, said hollow shaft rotatably supporting said first arm, and said drive source being fixed to said hollow shaft;

a rotary shaft rotatably supported in opposition to an output

shaft of said drive source, said rotary shaft projecting into a space defined below said hollow shaft;

a decelerator interposed between said rotary shaft and said output shaft of said drive source; and



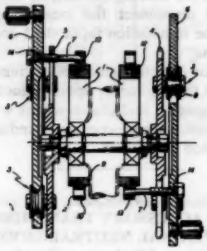
a pulley provided at a projecting end of said rotary shaft, one of said belts being laid around said pulley, wherein the belt laid around said pulley is of the endless type.

4,706,516

PEDAL MECHANISM FOR A BICYCLE HAVING THE PEDAL CRANK RADIALLY MOVABLE THEREIN

La Xi, East 101, No. 1, Gaoganlou, Haiguangsi, Peace District, Tianjing, China

Filed Apr. 24, 1986, Ser. No. 855,812
Claims priority, application China, Apr. 24, 1985, 85103089
Int. Cl.[4] G05G *1/14*
U.S. Cl. 74—594.1 **14 Claims**



1. A pedal mechanism for a bicycle having a frame with a lower bracket bearing axle, comprising:

a chain sprocket disposed on the bearing axle at one side thereof for rotation about said bearing axle;

a pedal crank rotatably mounted to the bicycle frame for rotation about an axis parallel to and spaced from said bearing axle;

cyclic variable power transmission means for transmitting from said crank to said chain sprocket a moment varying in accordance with a rotational position of said crank about said axis, said power transmission means including a guide pulley assembly with an inner member and an outer member rotatably mounted to one another by a plurality of bearing balls, one of said inner member and said outer member being fixed relative to said frame and another of said inner member and said outer member being rotatable relative to said frame about said axis, said power transmission means further including a radially extending slot in said chain sprocket and a mechanical transmission pin connected at one end to said pedal crank and at an opposite end to said other of said inner member and said outer member, said mechanical transmission pin traversing said slot; and

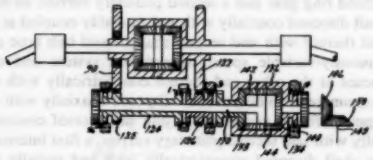
auxiliary means for supporting said crank relative to said chain sprocket.

4,706,517

AUTOMATIC POWER TRANSMISSION MECHANISM FOR A FOUR WHEEL DRIVE VEHICLE

Roy J. Garrett, Redford Township, Wayne County, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Oct. 21, 1985, Ser. No. 789,803
Int. Cl.[4] F16H *37/08*
U.S. Cl. 74—665 T **1 Claim**



1. In a transmission for a vehicle having two forward traction wheels and two rear traction wheels:

a multiple ratio transaxle having an input shaft adapted to be connected to an engine and arranged on a first axis and planetary gearing coaxially disposed relative to said input shaft and an output shaft;

a first differential gear mechanism forming a part of said transaxle and having a torque output gear and side gears adapted to be connected to axle shafts for said forward wheels, said side gears having a second axis parallel to said first axis;

a torque transfer drive means connecting said output shaft with said torque output gear including a first drive gear coaxially mounted relative to said torque output gear;

an interaxle geared differential having a differential carrier and a pair of side gears, an interaxle torque input shaft having a third axis parallel to said second axis, said interaxle differential carrier being connected to said interaxle torque input shaft;

a rear axle drive means connected to one of said interaxle differential side gears;

a second drive gear and a third drive gear coaxially mounted with respect to said interaxle differential side gears, said third drive gear being engaged with said torque output gear, said second drive gear being engaged with said first drive gear; and

first, second, third and fourth clutch means coaxially arranged with respect to said interaxle torque input shaft and independently actuatable for selectively connecting respectively (i) said third drive gear with said second drive gear, (ii) said second drive gear with said intermediate shaft, (iii) said third drive gear with the other side gear of said interaxle differential and (iv) said rear axle drive means with said carrier of said interaxle differential.

4,706,518

AUTOMATIC TRANSMISSION HAVING C.V.T. SYSTEM FOR A VEHICLE

Shuzo Moroto, Handa, and Shiro Sakakibara, Toyokawa, both of Japan, assignors to Aisin Warner Kabushiki Kaisha, Aichi, Japan

Division of Ser. No. 604,722, Apr. 27, 1984, Pat. No. 4,627,308. This application Jun. 19, 1986, Ser. No. 878,394
Int. Cl.[4] F16H *37/08*
U.S. Cl. 74—689 **1 Claim**

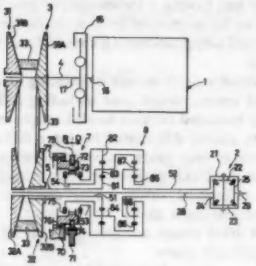
1. An automatic transmission having a C.V.T. system for a vehicle, comprising:

a coupling means having an input shaft and an output shaft;

a belt type continuously-variable speed transmission system having an input pulley mounted coaxially on a first shaft,

an output pulley mounted coaxially on a second shaft and a belt extending between said first and second pulleys to transfer power, each of said first and second pulleys having a fixed sheave and a movable sheave, said first shaft being disposed coaxially with and rotatably coupled with said output shaft of said coupling means, said second shaft being disposed side by side and in parallel with said first shaft;

a planetary gear mechanism having a first planetary gear set including a first sun gear, a first planetary gear, a first ring gear and a first planetary carrier, a second planetary gear set including a second sun gear, a second planetary gear, a second ring gear and a second planetary carrier, an input shaft disposed coaxially with and rotatably coupled at one end thereof with said second shaft of said belt type continuously-variable speed transmission system and connected at the other end thereof concentrically with said first sun gear, an output shaft disposed coaxially with said input shaft and connected at one end thereof concentrically with said second planetary carrier, a first intermediate shaft disposed concentrically with and radially outward in connection with said input shaft and connected at one end thereof with said first ring gear and said second sun gear and a second intermediate shaft disposed concentrically with and between said input shaft and said first intermediate shaft in a radial direction and connected at one end thereof with said first planetary carrier and said



second ring gear, each of said first and second intermediate shafts having splines on an outer circumference thereof at the other end which is positioned between said output pulley of said belt type continuously-variable speed transmission system and said planetary gear mechanism; and

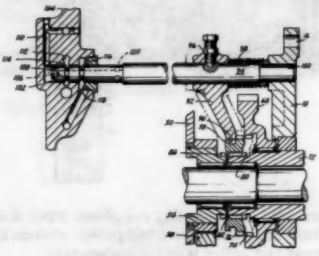
a forward-reverse changeover mechanism having one and single shift lever and one and single sleeve, said sleeve being positioned between said output pulley or said belt type continuously-variable speed transmission system and said planetary gear mechanism and disposed concentrically with and slidably movable but nonrotatable with respect to the rotational axis of said input shaft of said planetary gear mechanism and having splines on an inner circumference thereof adapted to selectively mesh with said splines formed on said first and second intermediate shafts, said shift lever being adapted to shift said sleeve between a first position where said splines formed on said sleeve are selectively meshed with said splines formed on said first intermediate shaft to hold said first ring gear and second sun gear in a stationary position to establish a forward range gear train and a second position where said splines formed on said sleeve are selectively meshed with said splines formed on said second intermediate shaft to hold said first planetary carrier and said second ring gear in a stationary position to establish a reverse range gear train.

4,706,519

CREEPER SPEED ACTUATOR FOR A TRACTOR TRANSMISSION

Rudolf Beim, Southfield, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Jan. 13, 1986, Ser. No. 818,510
Int. Cl.[4] B60K *41/22*; F16H *3/08*
U.S. Cl. 74—745 **10 Claims**



1. A creeper speed actuator system for a tractor transmission comprising:

a first shaft adapted to be clutched to an engine;

a transmission input shaft;

creeper speed reduction means for reducing the speed of the transmission input shaft relative to the speed of the first shaft;

coupler means for driveably connecting and disconnecting the creeper speed reduction means and the transmission input shaft;

actuating means for moving the coupler means to driveably connect and disconnect the creeper speed reduction means and the transsission input shaft and to disable the coupler means;

clutch means for directly selectively driveably connecting the first shaft to the creeper speed reduction means; and

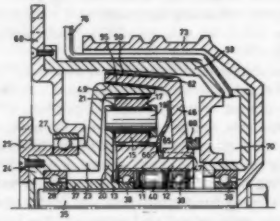
means for disengaging said clutch means when the coupler means disconnects the creeper speed reduction means and the transmission input shaft.

4,706,520

TWO SPEED ACCESSORY TRANSMISSION WITH OPTIONAL NEUTRAL MODE

Ramalingam Sivalingam, Mississauga, Canada, assignor to Mirram Drive Inc., Mississauga, Canada

Filed Dec. 17, 1985, Ser. No. 810,321
Int. Cl.[4] F16H *3/44*
U.S. Cl. 74—781 R **13 Claims**



1. An underdrive accessory transmission associated with an engine, comprising:

a planetary gear set comprising a sun gear having an integrally formed shaft, a plurality of planet gears positioned about and drivingly engaging the sun gear, a planet gear carrier, and a ring gear positioned about and drivingly

engaging the planet gears, wherein said ring gear provides rotational input to the transmission from the engine;

a fixed cover for the transmission;

cone clutch slidably affixed on the shaft of the sun gear and being capable of axial movement along the shaft, the clutch having frustoconical working surfaces engageable with compatible surfaces of either the ring gear or the cover;

means for sliding the cone clutch axially along the shaft of the sun gear;

an output shaft, the planet gear carrier being affixed about the output shaft; and

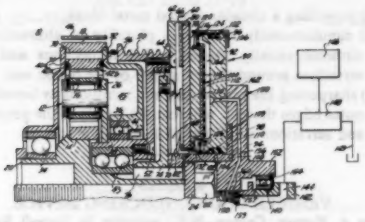
a one way clutch and support bearing being positioned between the sun gear and the output shaft, the clutch allowing the output shaft to rotate only in the direction of engine rotation, wherein the cone clutch provides a direct drive from the engine to the output shaft when it is engaged with the ring gear, the cone clutch provides a neutral mode of operation when it is disengaged from both the ring gear and the transmission cover, and the cone clutch provides an underdrive to the output shaft when it is engaged with the cover.

4,706,521

BELLOWS ACTIVATED UNDERDRIVE TWO SPEED ACCESSORY DRIVE

Andrew G. Anderson, London, and Leigh A. Shoji, Chatham, both of Canada, assignors to Bendix Electronics Limited, Chatham, Canada

Filed Jul. 31, 1986, Ser. No. 892,536
Int. Cl.[4] F16H *3/44, 57/10*
U.S. Cl. 74—785 **8 Claims**



1. A drive having high speed and low speed modes of operation comprising:

an input shaft;

a planetary gear set drivingly connected to said input shaft comprising a sun gear disposed about said input shaft;

a plurality of planet gears disposed about said sun gear and a ring gear disposed about and engaging said planet gears;

means for preventing said ring gear from rotating during said low speed mode;

an output pulley linked to and rotatable with said planetary gear set;

clutch means for connecting said output pulley to said input shaft during the high speed mode and for disengaging said output pulley from said input shaft during the low speed mode;

bellows means for moving said clutch means into and out from engagement during the high and low speed modes, wherein said bellows means comprises:

an annular base plate rotatable with said input shaft and adapted to receive and vent pressurized fluid including an opening therein;

a diaphragm attached to said base plate, defining an expandable fluid chamber therebetween;

an annular piston supported by said clutch means and disposed about said input shaft proximate a middle portion of said diaphragm and axially movable relative to said base plate with said clutch means in correspondence with the volume of said fluid chamber, and engageably connected to said clutch means for moving same into engagement; and

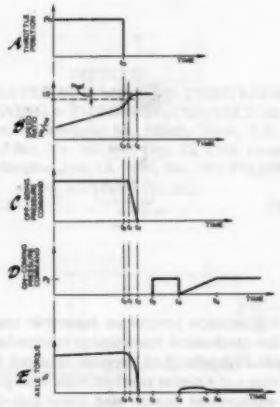
a sleeve received within the opening in said base plate including a first end attached to said base plate and a second end drivingly connected to said input shaft.

4,706,522

STEP-OUT CLUTCH-TO-CLUTCH UPSHIFT CONTROL

Larry T. Nitz, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 3, 1986, Ser. No. 825,356
Int. Cl.[4] B60K *41/08*
U.S. Cl. 74—866 **12 Claims**



1. In a motor vehicle having an engine for producing output torque in accordance with operator demand, an automatic transmission having upper and lower speed ratio mechanisms for effecting predefined upper and lower speed ratios between input and output shafts thereof and a fluid operated torque establishing device associated with each of said upper and lower speed ratio mechanisms, each such torque establishing device being effective when activated to establish a bidirectional path of torque transmission between the transmission input and output shafts via the associated speed ratio mechanism, a fluid coupling for transmitting the engine output torque to the input shaft of the transmission, and a shift controller for selecting a desired speed ratio in accordance with the operator demand and selectively activating and deactivating the torque establishing devices so as to effect the desired speed ratio, a method of operation which prevents driveline torque disturbances due to lash in the speed ratio mechanisms when a reduction in the operator demand causes the torque carried by the transmission input shaft to reverse polarity, said method comprising the steps of:

monitoring the operator demand and detecting the occurrence of a specified operating condition which is likely to result in a relatively sharp reversal in the polarity of torque applied to the transmission input shaft through the fluid coupling;

determining a measure of the torque transmitted through said fluid coupling in relation to the relative speeds of the engine and transmission input shaft following the detection of said specified operating condition; and

deactivating any activated torque establishing device when said measure of torque becomes less than a reference amount, so that when the reversal in applied torque occurs, the torque establishing devices are ineffective to transmit such torque to the vehicle driveline.

4,706,523

AUTOMATIC TRANSMISSION WITH UPSHIFT SMOOTHING VALVE

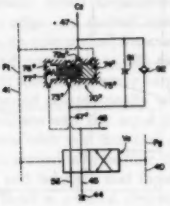
Masao Nishikawa, Tokyo; Takashi Aoki, Fujimi, and Yoshimi Sakurai, Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 2, 1984, Ser. No. 656,943

Claims priority, application Japan, Oct. 22, 1983, 58-163653[U]

Int. Cl.[4] B60K *41/06*

U.S. Cl. 74—869 1 Claim



1. A transmission control an automatic transmission comprising the mechanical transmission mechanism comprising a lower side hydraulic fluid pressure actuated friction engagement device and a higher side hydraulic fluid pressure actuated friction engagement device, said lower side friction engagement device being engaged and said higher side friction engagement device being disengaged when a certain lower speed stage of said transmission is engaged, and said lower side friction engagement device being disengaged and said higher side friction engagement device being engaged when a certain higher speed stage one higher than said lower speed stage of said transmission is engaged; a transmission control device, comprising;

(a) a two position valve means for selectively supplying actuating fluid pressure either to said lower side friction engagement device and draining said higher side friction engagement device to provide said lower speed stage, or for draining said lower side friction engagement device through a certain drain path and supplying actuating fluid pressure to said higher side friction engagement device to provide said higher speed stage;

(b) said certain drain path extending from said lower side friction engagement device to and through said two position valve means;

(c) output means for supplying a throttle pressure corresponding to the power output of an engine to which the transmission is connected;

(d) a variable flow resistance control valve means interposed in said certain drain path between said two position valve means and said lower side friction engagement device and connected to said output means for providing a higher flow resistance when the engine output is relatively high and for providing a lower flow resistance when the engine output is relatively low; and

(e) a one-way valve and an orifice bypass provided in parallel with each other and with said variable flow resistance control valve means, said one-way valve allowing substantially free flow of fluid from said two position valve means towards said lower side friction engagement device, but not in the reverse direction.

4,706,524

CIRCULAR KNIFE AND METHOD OF MAKING SAME

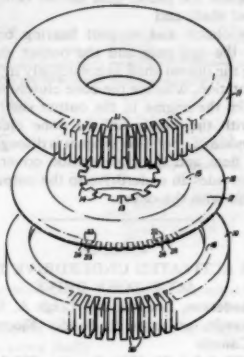
Robert R. Fischer, Michigan City, and W. James Fischer, Valparaiso, both of Ind., assignors to Urschel Laboratories, Incorporated, Valparaiso, Ind.

Division of Ser. No. 738,429, May 28, 1985, Pat. No. 4,660,453.

This application Oct. 21, 1986, Ser. No. 921,058

Int. Cl.[4] B21K *5/12*

U.S. Cl. 76—101 A 14 Claims



1. A method of making a circular knife comprising the steps of:

(a) providing a circular-shaped metal blank;

(b) simultaneously forming a plurality of alternating and circumferentially spaced radial projections and offset serrations around the periphery of the blank; and

(c) sharpening the projections and serrations by beveling the outer edges thereof, wherein the bevels of the projections and serrations are disposed in a common plane.

4,706,525

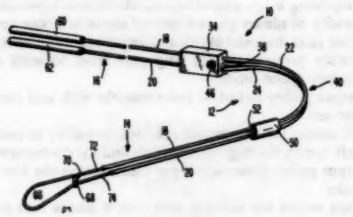
VEHICLE DOOR UNLOCKING DEVICE

Brian A. Fenner, Groton, N.Y., assignor to Cornell Research Foundation, Inc., New York, N.Y.

Filed Jan. 7, 1986, Ser. No. 816,761

Int. Cl.[4] B25B *33/00*

U.S. Cl. 81—15.9 3 Claims



1. A vehicle door unlocking device for use with a vehicle having an openable door including a door unlocking means located within the interior of the vehicle, said vehicle door unlocking device comprising:

first and second spaced, rigid, arcuate hollow guide tubes, said guide tubes being joined to a solid guide rod positioned between said first and second spaced guide tubes, said first and second guide tubes and said guide rod forming a rigid, arcuate guide member sized and curved for

insertion into the interior portion of the vehicle through an opening adjacent the openable door;

a mounting block having spaced bores, first ends of said guide tubes and said guide rod being secured in said spaced bores;

first and second flexible wires passing through said first and second hollow guide tubes respectively, and being freely slideable therewithin;

an eye formed at a first, interior portion of said first wire, a first, interior portion of said second wire passing through said eye and forming a door unlocking means ensnaring loop, said loop being capable of being varied in size by relative motion between said first and second wires to engage the door unlocking means;

a hollow insertion tip attached to second ends of said first and second guide tubes and said solid guide rod, said insertion tip forming a shield having an open end for storage of said eye and loop during insertion of said guide member into the interior portion of the vehicle; and

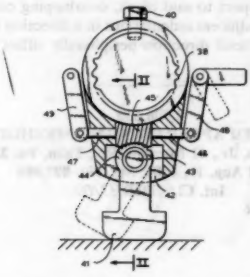
enlarged manipulating handles formed on second, exterior portions of said first and second flexible wires, said size variation of said loop when said arcuate guide member is inserted through the opening adjacent the openable door and into the interior portion of the vehicle to cause said loop to securely engage the door unlocking means and to unlock the vehicle door being accomplished by manipulation of said manipulating handles and said guide member.

4,706,526

FLUID OPERATED WRENCH

John K. Junkers, 7 Arrowhead La., Saddle River, N.J. 07458

Filed Aug. 21, 1985, Ser. No. 768,037
Int. Cl.[4] B25B *13/16*
U.S. Cl. 81—57.39 **10 Claims**



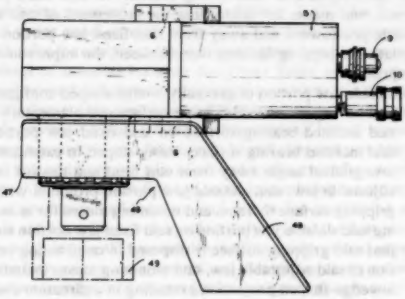
1. A fluid-operated wrench for tightening or loosening threaded connectors comprising an action part having a ratchet gear mounted turnably about its axis and having a plurality of teeth, and driving means engageable with said teeth of said ratchet gear and turning the latter for tightening or loosening a threaded connector with a tightening or loosening force respectively; and a reaction part arranged to abut against a stationary support and to counteract a reaction force created during tightening or loosening a threaded connector by applying the reaction force to the stationary support in a predetermined direction, said reaction part including an attachment portion attachable to said action part, and an abutment member arranged to abut against a stationary support during tightening or loosening a threaded connector, said attachment portion and said abutment member of said reaction part being formed as two separate members engageable with one another so that said abutment member can be moved relative to said attachment portion and thereby withdrawn from the stationary support, said abutment member being turnable about an axis which extends transverse to the axis of turning of said ratchet gear; and means for moving said abutment member relative to said attachment portion, said moving means being separate from said driving means and operate independently from the latter, so that said driving means perform only the function of turning said ratchet gear of said action part without acting on said abutment member of said reaction part, while said moving means perform only the function of moving said abutment member of said reaction part without acting upon said ratchet gear of said action part.

4,706,527

FLUID OPERATED WRENCH FOR TIGHTENING OR LOOSENING A THREADED CONNECTOR

John K. Junkers, 7 Arrowhead La., Saddle River, N.Y. 07458

Continuation of Ser. No. 663,996, Oct. 22, 1984, abandoned.
This application Jun. 19, 1986, Ser. No. 876,268
Int. Cl.[4] B25B *13/46*
U.S. Cl. 81—57.39 **13 Claims**



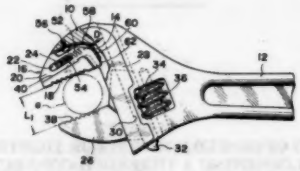
1. A fluid operated wrench for tightening or loosening a threaded connector without turning the wrench around, comprising fluid operated cylinder and piston means having an axis; support means including a first support portion for supporting said cylinder and piston means, and a second support portion for supporting a reaction member and extending substantially perpendicularly to said axis of said cylinder and piston means; ratchet means held by said first support portion and having a ratchet axis extending substantially perpendicular to the latter; reversable transmission means intermediate said cylinder and piston means and said ratchet means to drive the latter in one or the opposite direction during movement of said piston means; means connected to said ratchet means for engaging a threaded connector to be turned, whereby during turning of the threaded connector in one direction a force is created tending to turn said support means in the opposite direction; said reaction member arranged to abut against a stationary object; and means for adjustably attaching said reaction member to said second support portion, said attaching means includes incremental positioning means extending 360° about the ratchet axis so that said reaction member is supported by said second support portion and can be incrementally adjusted to abut against a stationary object in incremental positions along an arc of 360° around said ratchet axis, including turning said reaction member by 180° to abut against a stationary object located at either side of a threaded connector to be turned while said support means remains stationary.

4,706,528

ADJUSTABLE WRENCH

Isao Inoue, Sanjo, Japan, assignor to Daiya Seiko Kabushiki-Kaisha, Niigata, Japan

Continuation of Ser. No. 216,152, Dec. 15, 1980, abandoned, and Ser. No. 491,278, May 4, 1983, abandoned. This application Oct. 21, 1986, Ser. No. 920,912
Int. Cl.[4] B25B *13/12*
U.S. Cl. 81—179 1 Claim



1. In an adjustable open-end wrench for gripping and turning an object wherein said wrench is provided with a handle, a head at one end of said handle having a fixed jaw portion and an inclined bearing surface on said fixed jaw portion, an adjustable jaw disposed in confronting relation to said fixed jaw portion, and means for controlling the movement of said adjustable jaw toward and away from said fixed jaw portion to regulate the gripping distance therebetween, the improvement comprising:

a slidable jaw portion of generally wedge-shaped configuration having an inclined bearing surface complementary to said inclined bearing surface on said fixed jaw portion, said inclined bearing surfaces being sloped to extend at a low gradual angle away from said head and toward said adjustable jaw, said slidable jaw portion provided with a gripping surface thereon, and mounting means for mounting said slidable jaw portion on said fixed jaw portion such that said gripping surface is disposed in confronting relation to said adjustable jaw, said mounting means including a wedge-shaped projection extending in a direction away from said gripping surface and inserted into an open slot in said fixed jaw portion, said projection provided with a pin-receiving, elongated slot, a pin mounted in stationary relation to said fixed jaw portion for extension across said open slot and through said pin-receiving, elongated slot in a direction transversely of the length of said slot; and

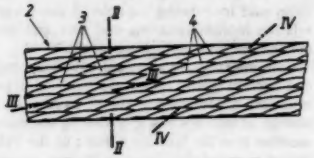
first spring means disposed in said pin-receiving, elongated slot between said pin and an end of said pin-receiving, elongated slot to urge said slidable jaw portion in a direction toward said head, second spring means in the form of a plate spring member mounted in the bottom of said open slot and having biasing means at one end of said plate spring member pressing against a surface of said wedge-shaped projection to yieldingly urge said slidable jaw portion in a direction to decrease the gripping distance between said fixed jaw portion and said adjustbale jaw, said open slot and said projection being elongated in a direction substantially parallel to said inclined bearing surfaces so that said slidable jaw portion is slidable in a direction away from said head to overcome the urging of said first spring means and reduce the gripping distance betwen said fixed jaw portion and said adjustable jaw in response to gripping and turning of an object in one direction and being further movable in a return direction toward said head under the urging of said first spring means to increase the gripping distance between said fixed jaw portion and said adjustable jaw when the object is released.

4,706,529

A METHOD OF MAKING A CLAMPING RING FOR USE IN A PIPE JOINT

Erwin Hawle, Vöcklabruck, Austria, assignor to E. Hawle & Co., Vocklabruck, Austria

Division of Ser. No. 704,711, Feb. 25, 1985, Pat. No. 4,657,288. This application Oct. 23, 1986, Ser. No. 922,306
Int. Cl.[4] B23B *1/00*
U.S. Cl. 82—1 C 2 Claims



1. A method of making a clamping ring for use in a pipe joint, comprising the steps of:

rotating an annular clamping ring blank having an internal surface about an axis;

revolving a cutting tool in a plane generally transverse to said axis in a circular orbit which is smaller in diameter than said internal surface and bringing said cutting tool into cutting engagement with said surface to form indentations therein; and

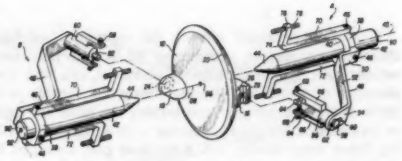
imparting a feed movement to said cutting tool concurrently with the revolving thereof in said circular orbit, whereby the indentations formed in said surface are contiguous, generally elongated and defined by arcuate ridges, with the indentations and ridges extending generally peripherally with respect to said blank, overlapping one another and having adjacent indentations in a direction transverse to the peripheral direction peripherally offset from one another.

4,706,530

SPINNER APPARATUS AND METHOD

Haywood Thomas, Jr., 41 Mansion Rd., Tabb, Va. 23692

Filed Aug. 19, 1986, Ser. No. 897,956
Int. Cl.[4] B23B *33/00*
U.S. Cl. 82—40 R 5 Claims



1. A spinner apparatus for adapting a butterfly-valve disc to be turned on a lathe, said butterfly-valve disc being of a type having first and second axially protruding mounting bosses respectively positioned on opposite sides thereof at approximately opposite positions along a perimeter edge thereof, said bosses each having a close-to radially-directed boss hole for receiving mounting shafts, said spinner apparatus comprising two spinner mechanisms for respectively attaching to opposite sides of said butterfly-valve disc, each to be engaged by a lathe mount, each of said mechanisms comprising:

a block;

an elongated centering shaft mounted on said block, said block including means for holding said shaft affixed to said block, an inner end of said shaft adapted for contacting said disc approximately at its center and an outer end adapted to be engaged by a lathe for rotating said disc;

a spinner-bar means fastened to said block having balancing means for extending into said boss hole on the side of said valve disc on which said spinner mechanism is mounted, said spinner-bar means including means for adjusting the position of said balancing means relative to said block;

aligning bar means attached to said block for making contact with the side of said valve disc on which said spinner mechanism is mounted at positions removed from said boss for helping to hold said valve disc with its axis aligned with the axis of said centering shaft, said aligning bar means including means for adjusting locations of contact points between it and said disc relative to said block;

whereby when said spinner apparatus is attached to a valve disc, outer ends of said elongated centering shafts can be engaged by a lathe for turning it to work its perimeter edge with a lathe tool.

4,706,531

DEVICE FOR CUTTING BAND-SHAPED OR STRAND-SHAPED MATERIAL

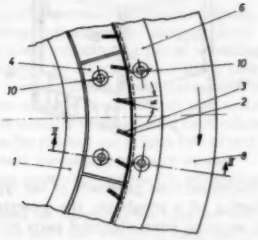
Wilfried Blauhut; Günter Hoschek, and Robert Malojer, all of Linz, Austria, assignors to Chemie Linz Aktiengesellschaft, Linz, Austria

Filed Feb. 10, 1986, Ser. No. 828,114

Claims priority, application Fed. Rep. of Germany, Feb. 22, 1985, 3506282

Int. Cl.[4] D01G *1/04*

U.S. Cl. 83—346 **2 Claims**



1. A device for cutting band-shaped or strand-shaped material comprising a movable cutter roller defined by a circular periphery and containing a plurality of cutter blades at a uniform distance from one another, wherein said cutter blades have outwardly-facing cutting edges located around the periphery of said cutter roller and between a lower and an upper circular disc-shaped body, said lower disc-shaped body being in the form of a ring and said cutter blades being arranged as a winding body which supports said material by means of at least one part of the cutting edges of said cutting blades in radially superimposed coil layers and holds the innermost of said coil layers in each case, and a loading device which presses said material against the cutting edges, wherein each of the cutter blades is held by slots in separate individual cutter holders which are rotatably mounted in bores in the lower and upper circular disc-shaped bodies and which are attached by means of screws to an adjusting ring located above the upper base body, so that by turning said adjusting ring relative to the upper base body, the cutter holders turn simultaneously about their axes, whereby a setting angle alpha to the radius of the circular cross-section of the device of 5° to 25° for the cutter blades with the cutting edges facing in the direction of movement of the cutter roller is adjusted uniformly at all cutter holders by turning said adjusting ring.

4,706,532

CUTTING EQUIPMENT WITH RULES

Osamu Hashimoto, 68, 3-chome Esaka-cho, Suita City, Osaka, Japan

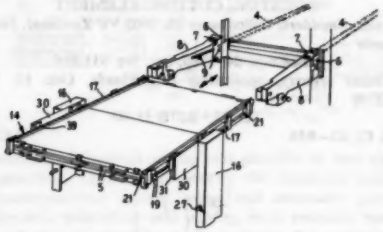
PCT No. PCT/CH85/00122, § 371 Date Apr. 17, 1986, § 102(e) Date Apr. 17, 1986, PCT Pub. No. WO86/01444, PCT Pub. Date Mar. 13, 1986

PCT Filed Aug. 20, 1985, Ser. No. 865,560

Claims priority, application Japan, Aug. 21, 1984, 59-174398

Int. Cl.[4] B23D *35/00*

U.S. Cl. 83—563 **2 Claims**



1. In a cutting apparatus having a lower panel, a pair of first guides positioned above said lower panel, an upper panel support being mounted in detachable fashion in said first guides, said upper panel support being provided with a cutting form with rules for coacting with the lower panel, means for moving a sheet of material between the lower panel and the upper panel support in a direction extending transverse to a direction of the first guides, the improvements comprising an adjustable table having a frame; a table having a pair of lateral supports being mounted in said frame, said lateral supports providing a first pair and a second pair of second guides extending parallel to each other with the first and second pairs being spaced apart by a predetermined amount; and means for positioning said table and lateral supports to selectively present the first pair of second guides in alignment with the first guides of said apparatus to form an extension thereof and then subsequently presenting the second pair of second guides in alignment with said first guide to form an extension thereof as the first pair are moved out of alignment.

4,706,533

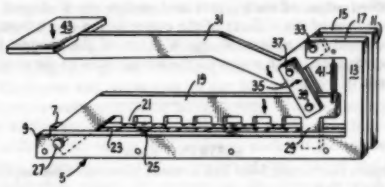
SHEAR PUNCH

Joe D. Glulie, 1086 E. Meadow Cir., Palo Alto, Calif. 94303

Filed May 29, 1986, Ser. No. 868,276

Int. Cl.[4] B26F *1/14, 1/44*

U.S. Cl. 83—599 **4 Claims**



1. A punch for punching a rectangular hole is a sheaf of paper or the like comprising in combination:

a. a male punch member having a rectangular shank and two, spaced apart, pointed piercing members, said piercing members being located at the ends of the punch and centrally of the sides of said punch and being bridged by a concave arcuate cylindrical surface and having evenly

tapered concave, spherical side walls leading from said rectangular shank to said piercing members,

b. a mating female socket member consisting of an elongated slot complementary to the square shank of the male member,

c. whereby as said punch member descends into a sheaf of paper supported on said female member said punch first pierces at the extreme ends of the punch and then shears the sides of the hole as it passes down into said female member.

4,706,534

ROTATING CUTTING ELEMENT

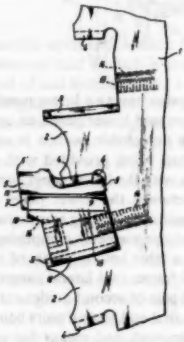
Cornelis Smolders, Collenkamp 18, 6903 VP Zevenaar, Netherlands

Filed Sep. 24, 1986, Ser. No. 911,584

Claims priority, application Netherlands, Oct. 11, 1985, 8502790

Int. Cl.[4] B27B *33/08*

U.S. Cl. 83—844 **2 Claims**



1. A rotating cutting element with a row of cutters which are fastened detachably in the peripheral direction at regular intervals from each other in recesses in the periphery of a carrier by means of a wedge, where each cutter has a profiled rectilinear front edge which fits into a complementarily shaped edge of the recess of the carrier, also a rectilinear profiled rear edge which fits into the complementarily profiled front edge of the wedge, said wedge having a rectilinear profiled rear edge which mates with the complementarily profiled rear edge of the recess, and where the front edge and rear edge of each cutter form an angle with each other which opens in the direction of the carrier, and each recess has a flat internal face which serves as a stop surface for the flat internal face of the cutter, which flat faces have surface contact, characterized in that the profiled edges of each cutter and wedge are V-shaped, with the apexes of the V-faces of the cutter facing away from each other and the apexes of the V-faces of the wedge facing towards each other, and with the wedge fixed to the carrier by means of a screw.

4,706,535

SCORING SAW

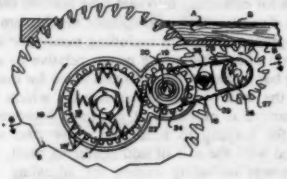
Jacques Ducharme, 5410 2nd Avenue, Montreal Quebec, Canada H1Y 2Y3

Filed Feb. 17, 1987, Ser. No. 15,948

Int. Cl.[4] B27B *5/24, 33/00*; B27H *19/10*

U.S. Cl. 83—863 **8 Claims**

1. A scoring saw assembly for use in association with a conventional bench saw having a table with a longitudinal opening, a power operated main shaft mounted parallel to the plane of said table and transverse to said opening, and a main saw blade secured to said main shaft and protruding through said opening, said assembly comprising: a rigid elongated casing adapted to extend forwardly of and to be rotatably mounted on said main shaft at its rear end, a scoring saw blade shaft rotatably carried by the front end of said casing about an axis parallel to that of said main shaft; driving means carried by



said casing and including a first gear adapted to be fixed to said main shaft for driving a scoring blade fixed on said scoring blade shaft in opposite rotational direction to that of said main blade; and a support assembly adapted to be fixedly secured to said table and to said front end of said casing.

4,706,536

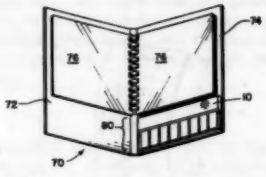
MEMBRANE KEYBOARD FOR SONGBOOK TONE GENERATOR

Sam Sanders, Nashville, Tenn., assignor to JTG of Nashville, Inc., Nashville, Tenn.

Filed Feb. 5, 1986, Ser. No. 826,299

Int. Cl.[4] G10H *1/34, 5/00*

U.S. Cl. 84—1.01 **7 Claims**



1. In an electronic tone generator of the type incorporated into the binding of a songbook, the generator including a housing for securing interconnected parts including a finger operable keyboard, an electronic tone generator circuit, a power source and an audio tone transducer, an improved direct electrical contact-providing keyboard comprising:

a printed circuit base means for mounting said electronic tone generator circuit and for carrying a set of paired upwardly facing printed circuit traces, each pair of traces being arranged interdigitally and one of each of the pair of traces being electrically common for all keys, and the other of each of the pair of traces being electrically unique for each key, the pairs being arranged in a horizontal row and being in electrical connection with the electronic tone generator circuit,

a membrane overlay vacuum formed of thin thermoplastic sheet material to define a horizontal row of playing keys directly overlying and contiguous with the set of paired printed circuit traces, each key being formed as a plateau area, and having a vertical depression spring rib separating each key from each adjacent key, the depression spring rib aligned to contact the base means and maintain the adjacent plateau areas above corresponding pairs of traces and to provide resilience enabling each plateau area to be depressed by pressure from a finger thereby to facilitate physical contact with the base means and to return to its original location upon removal of said finger pressure, each pair of interdigital traces being sized and spaced to

extend substantially throughout the finger contact area of its corresponding key,

each key including an elastomeric foam pad having a dimension substantially coextensive with and affixed to the underside of each plateau area and carrying an electrically conductive material substantially over the entirety of a surface thereof which is oppositely facing and slightly spaced away from a corresponding pair of interdigital traces.

4,706,537

TONE SIGNAL GENERATION DEVICE

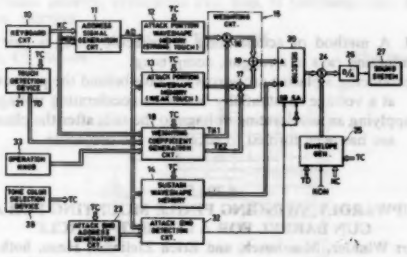
Shigenori Oguri, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Shizuoka, Japan

Filed Mar. 5, 1986, Ser. No. 836,247

Claims priority, application Japan, Mar. 7, 1985, 60-45508; Mar. 7, 1985, 60-45509; Mar. 7, 1985, 60-45510

Int. Cl.[4] G10H *1/02, 1/42, 7/00*

U.S. Cl. 84—1.03 **20 Claims**



12. A tone signal generation device comprising:

waveshape memeory means for storing plural waveshape data respectively constituting plural waveshapes each of which comprises an attack portion and a sustain portion, the sustain portions of said plural waveshapes being stored in the phase-adjusted state so that said sustain portions become substantially in phase with each other;

readout means for reading out at least two of said waveshape data from said waveshape memory means;

weighting data generation means for generating weighting data; and

weighting means for weighting the read out waveshape data in accordance with the weighting data, and (b) thereafter combining the weighted waveshape data and providing the combined data as a tone signal.

4,706,538

ELECTRONIC MUSICAL INSTRUMENT WITH AUTOMATIC MUSICAL ACCOMPANIMENT PLAYING SYSTEM

Kiyoshi Yoshida, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Shizuoka, Japan

Filed Dec. 8, 1986, Ser. No. 939,344

Claims priority, application Japan, Dec. 10, 1985, 60-275926

Int. Cl.[4] G10H *1/22, 1/42*

U.S. Cl. 84—1.03 **5 Claims**

1. An electronic musical instrument having a keyboard and an automatic musical accompaniment playing system for automatically playing a musical accompaniment, said electronic musical instrument comprising:

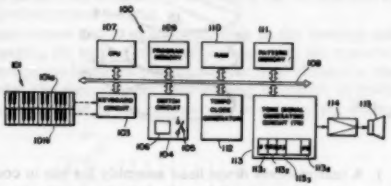
keyboard circuit means responsive to each depression of key on the keyboard for outputting a key code representative of said depressed key;

tone generating means having a plurality of tone signal generating channels each for generating a tone signal representative of a tone to be generated;

assigning means for assigning said key codes from said keyboard circuit means to said plurality of tone signal generating channels, each of said tone signal generating channels generating the tone signal corresponding to the key whose key code is assigned thereto;

playing mode selection means for selecting one of a plurality of playing modes of the electronic musical instrument which include an automatic playing mode wherein the automatic musical accompaniment system operates; and

channel reserving means for reserving a predetermined



number of channels among said plurality of tone signal generating channels for use by the automatic musical accompaniment system when said automatic playing mode is selected by said playing mode selection means, said channel reserving means selecting the channels of said predetermined number from among said plurality of channels according to a predetermined priority order which is based on the conditions of tone generation of the respective channels.

4,706,539

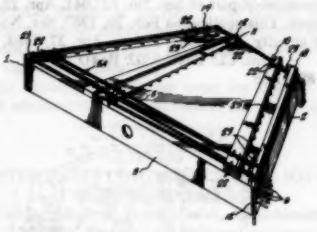
SANTUR

Parichehr Bagheri, 936 N. San Vicente, Unit #12, Los Angeles, Calif. 90069

Filed Apr. 14, 1986, Ser. No. 851,536

Int. Cl.[4] G10D *1/12*

U.S. Cl. 84—284 **4 Claims**



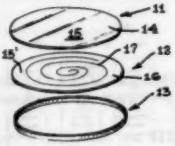
1. A santur comprising two side walls, a front wall, a back wall, the side walls joined at a 45° angle with the front wall, a plurality of strings extending across the santur from one side wall to the other and being arranged into a plurality of groups of four strings per group and being attached to the side walls with hitch-pins and wrest-pins on the side walls of the santur, the improvement comprising bridge means wherein the length of the bridge means is substantially equal to the length of the side walls of the santur and wherein each bridge means is arranged to carry a plurality of groups of four strings, and left and right click means for supporting the strings located on each side wall of the santur wherein each click means is arranged to carry a first plurality of the groups of four strings and to permit passage thereunder of a second plurality of the groups of four strings, and first lever means for adjusting tension of the strings located on the bridge means and left click means, and second lever means for adjusting tension of the strings located on the surface of the santur near each left and right click means.

4,706,540

TEAR RESISTANT DRUM HEAD ASSEMBLY

David G. Donohoe, Rte. 2, Box 276, Springville, Calif. 93265

Filed Jan. 7, 1987, Ser. No. 1,138
Int. Cl.[4] G10D *13/02*
U.S. Cl. 84—414 7 Claims



1. A tear resistant drum head assembly for use in combination with a conventional drum body; wherein, the drum head assembly comprises:

a primary layer comprising a thin generally circular continuous sheet of synthetic material;

a secondary layer comprising a thin generally circular scored sheet of synthetic material; wherein, the secondary layer is laminated to the underside of the primary layer and the peripheral edges of the primary and secondary layers are joined together; and,

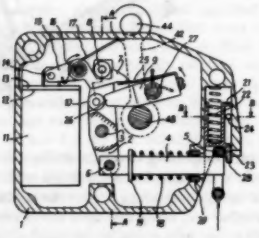
a rigid support member adapted to secure the peripheral edges of the primary and secondary layers; wherein, the rigid support member forms the operative connection between the drum head assembly and the drum body.

4,706,541

DEVICE FOR RETAINING AND RELEASING A WIRE FOR ARMING BOMB FUSES

Pierre F. Coutin, Paris, France, assignor to R. Alkan & Cie

Continuation-in-part of Ser. No. 727,041, Apr. 25, 1985, abandoned. This application Feb. 20, 1987, Ser. No. 16,912
Claims priority, application France, Apr. 27, 1984, 84 06716
Int. Cl.[4] F41F *5/02*; B64D *1/04*
U.S. Cl. 89—1.55 4 Claims



1. Device for retaining and releasing the end ring of a safety wire which, when tripped, ensures setting of bomb fuses, this device comprising:

a practically rectilinear lever pivoting on a fixed pin;

a retaining finger pivoted at one end of said lever and co-acting with a recess for retaining the end ring of the safety wire, said retaining finger being urged by a first spring in a direction allowing said ring to be freed;

a snap hook co-acting with a roller provided at the other end of said lever and connected to an electromagnet; and

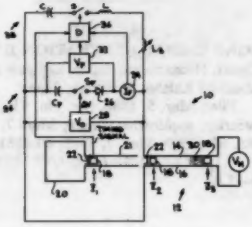
a retractable element depending of a bomb tripping mechanism, said element in a working position co-acting with a roller provided on an intermediate part of said lever.

4,706,542

LOW VOLTAGE ARC FORMATION IN RAILGUNS

Ronald S. Hawke, Livermore, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Aug. 5, 1985, Ser. No. 762,649
Int. Cl.[4] F41F *1/02*
U.S. Cl. 89—8 20 Claims



1. A method of accelerating a projectile along a pair of conducting rails in a railgun, comprising:

producing a plasma arc across the rails behind the projectile at a voltage substantially below an accelerating voltage;

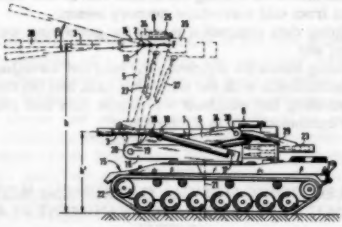
applying an accelerating voltage to the rails after the plasma arc has been formed to accelerate the projectile.

4,706,543

UPWARDLY SWINGING PINILE MOUNTING FOR A GUN BARREL FOR A COMBAT VEHICLE

Gert Winkler, Meerbusch, and Erich Zielinksi, Haan, both of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Duesseldorf, Fed. Rep. of Germany

Filed Nov. 4, 1985, Ser. No. 794,745
Claims priority, application Fed. Rep. of Germany, Nov. 2, 1984, 3440041
Int. Cl.[4] F41F *23/02*
U.S. Cl. 89—38 6 Claims



1. Upwardly swingable pinile mounting for a gun barrel mounted on a cradle of a battle tank with at least one piston cylinder unit for adjusting the muzzle height of the gun barrel which unit is pivotally connected at its cylindrical end with a transversely adjustable part of the battle tank, and is pivotally connected at its piston side end with a gun mount arm carrying the gun barrel; and with a barrel recoil brake mechanism connected to the gun barrel cradle; said piston cylinder unit adjusts the muzzle height "h" of the gun barrel and includes a braking means; said means includes a passage cross-section for effecting a nearly constant brake pressure via a control element amplifier dependent on the piston rod movement of the piston cylinder unit during recoil of the gun barrel and pressure-dependent on the hydraulic pressure that accrues in a barrel recoil braking mechanism which is operatively mounted in the gun barrel cradle, said pressure being throttled, said barrel brake mechanism effecting a resistance free gun barrel recoil "d" during the

initial recoil of the gun barrel, whereby said recoil of the gun barrel includes recoil path regions "a" and "b" which jointly form the recoil path "c" of the recoiling masses formed by the gun barrel and parts connected thereto, the energy of said recoiling masses is simultaneously absorbed on the one hand by the piston cylinder unit over the recoil path region "a" which corresponds to the angle α traversed by the gun mount arm connected thereto, and, on the other hand, by the barrel brake mechanism over the recoil path region "b", and said barrel brake mechanism and braking means jointly producing a nearly constant force F at the trunnion of the gun barrel cradle during the braking process of the recoil path "c".

4,706,544

CANNON LOADER FOR SEPARATE CHARGE AND PROJECTILE

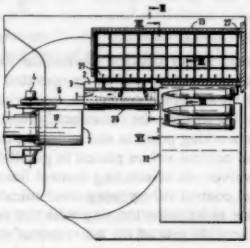
Erich Zielinski, Haan, and Theo Heckenbach, Krefeld-Stratum, both of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Duesseldorf, Fed. Rep. of Germany

Filed Oct. 10, 1985, Ser. No. 786,340

Claims priority, application Fed. Rep. of Germany, Oct. 13, 1984, 3437588

Int. Cl.[4] F41F *9/06*

U.S. Cl. 89—46 **10 Claims**



1. In combination with a turret carrying an axis-defining gun barrel having one side and a rear-end breech and pivotal in the turret about a horizontal elevation axis transverse to the barrel axis, an apparatus in the turret behind the breech for separately loading projectiles and charges into the breech, the loading apparatus comprising:

respective projectile and charge magazines in the turret behind the breech including respective means for feeding the projectiles and charges to respective pickup positions both located in the turret horizontally to the same one side of the barrel axis;

a loading arm pivotal about the horizontal axis; and

respective projectile and charge grabs movable on and with the arm between respective pickup positions and loading positions aligned with the breech, whereby in the loading positions the projectiles and charges can be pushed from the grabs into the breech.

4,706,545

BRAKE VALVE INFINITELY VARIABLE PRESSURE INTENSIFICATION

Dietmar Gössl, Gössenheim; Ludwig Muncke, and Kurt Wittich, both of Lohr, all of Fed. Rep. of Germany, assignors to Mannesmann Rexroth GmbH, Fed. Rep. of Germany

Filed Oct. 16, 1985, Ser. No. 788,074

Claims priority, application Fed. Rep. of Germany, Nov. 9, 1984, 3441048

Int. Cl.[4] F15B *13/04*

U.S. Cl. 91—32 **15 Claims**

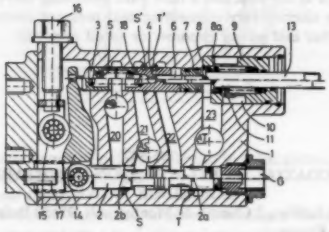
1. A brake valve, comprising:

a housing;

a balance arm supported in the housing and having first and second ends which are pivotable about a fulcrum member which abuts the balance arm;

a control piston mounted to slide in the housing and engaging the first end of the balance arm so as to pivot the first end of the balance arm in response to a master pressure which may be applied to the control piston, the control piston defining a flow path for connecting a source of primary pressure to a brake when the control piston has slid sufficiently to pivot the first end of the balance arm to a predetermined degree;

a measurement piston mounted to slide in the housing and engaging the second end of the balance arm, the measurement piston being coupled by a brake fluid channel to the brake, the measurement piston being operative to pivot the second end of the balance arm to counter the sliding



motion of the control piston in response to a braking pressure supplied to the measurement piston from the brake through the fluid channel, so that a mechanical advantage ratio between the braking pressure and the master pressure is established by the balance arm and so that when the braking pressure reaches a predetermined value related to the mechanical advantage ratio, the control piston is pushed back and the source of primary pressure is disconnected from the brake;

a stop member located in the path of the control piston to limit the maximum displacement thereof so that an excessive master pressure applied to the control piston is taken up by the stop member; and

means for moving the fulcrum over the balance arm to permit adjustment to the mechanical advantage ratio.

4,706,546

BOOSTER RATIO CONTROLLER FOR LIQUID PRESSURE BOOSTER

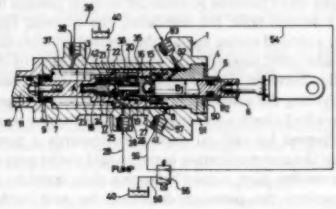
Hidefumi Inoue, Ohmiya; Yuzoh Gotoh, Higashimatsuyama, and Kimio Ishihara, Kawagoe, all of Japan, assignors to Jidosha Kiki Co., Ltd., Tokyo, Japan

Filed Jul. 30, 1985, Ser. No. 760,807

Claims priority, application Japan, Aug. 8, 1984, 59-166274; Aug. 18, 1984, 59-172105

Int. Cl.[4] F15B *9/09*; B60T *13/20*

U.S. Cl. 91—370 **7 Claims**



1. A vehicular brake or clutch liquid pressure booster re-

sponsive to an input for providing an output boosted in a selected ratio with respect to the input, the booster comprising:

a power piston and an input shaft slidably fitted in a housing;

a power chamber formed at one end of the power piston;

a control valve responsive to an input to said input shaft for introducing an oil pressure into the power chamber to thereby drive the power piston forward and to act upon the input shaft to provide a reaction to the input, said oil pressure corresponding in magnitude to said input applied to said input shaft; and

booster ratio controller means actuable for changing said booster ratio, said booster ratio changing means comprising a step formed in at least one of the input shaft and the power piston, said step and housing in combination defining a pressure chamber having a pressure responsive surface at the step, and a flow path switching valve actuable for alternatively connecting said pressure chamber with either said power chamber or an oil reservoir.

4,706,547

COAXIAL MULTI-FUNCTION INSERTABLE CARTRIDGE VALVE

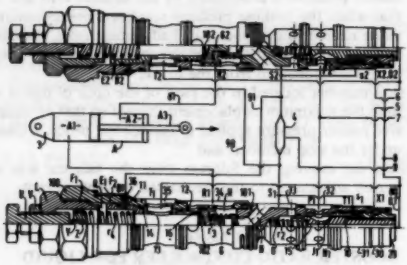
Hubert LeBlon, 2 Chemin de Montgeroult, 95650 Boissy L'Aillerie, France

Filed Aug. 21, 1986, Ser. No. 898,524

Claims priority, application France, Aug. 26, 1985, 85 12707

Int. Cl.[4] F15B *13/042*

U.S. Cl. 91—420 **9 Claims**



1. A coaxial multi-function insertable hydraulic distribution cartridge valve which comprises an oil inlet port, an oil return port, a control pressure inlet port for controlling said valve, an outlet port for providing oil having an actuating pressure, a pressure reading port for reading the actuating oil pressure, a pressure data receiving port for receiving the actuating oil pressure from said pressure reading port, a drainage port, and a balancing pressure inlet port, a first pressure-compensating slide urged into a position to maintain integral passage by a first spring, a second slide for regulating the oil inlet flow rate, urged by a second spring against the control pressure delivered by said inlet port, towards the position of closure of the communication between said oil pressure inlet port and said outlet port delivering the actuating pressure, an isolating check valve and a backfeed check valve urged by a third spring against the flow delivered by said oil inlet port, towards a position of closure of the communication between said outlet port and said pressure reading port, a third balancing slide urged by a fourth spring against the pressure delivered by said outlet port, towards the position of closure of the communication between said outlet port and a return port for returning the oil to a reservoir.

4,706,548

TWO-HAND SAFETY CONTROL MECHANISM

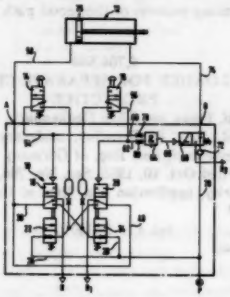
Günter Baldauf, Rommelshausen, and Helmut Ott, Stuttgart, both of Fed. Rep. of Germany, assignors to Herion Werke KG, Fellbach, Fed. Rep. of Germany

Filed Aug. 18, 1986, Ser. No. 897,752

Claims priority, application Fed. Rep. of Germany, Aug. 20, 1985, 3529802

Int. Cl.[4] F15B *13/04*

U.S. Cl. 91—424 **18 Claims**



1. A two-hand safety control mechanism for a consumer having an inlet connection and being operated by a pressure medium fed from a supply connection; comprising:

valve means for shifting the consumer between an idle position and a working position and including first and second directional control valves placed in parallel and actuated by pilot valves via connecting control lines, each of said directional control valves being mechanically linked with a slide gate and communicating with the supply connection via the slide gate of the other one of said directional control valves, said directional control valves being linked to said inlet connection for supplying pressure medium to one side of the consumer;

a third directional control valve connecting the other side of the consumer directly to the supply connection; and

an AND-valve having at least two inputs connected to said control lines arranged between said first and second directional control valves and said associated pilot valves and an output cooperating with said third directional control valve.

4,706,549

OIL PRESSURE CONTROL SYSTEM FOR POWER TRANSMISSIONS

Toshiyuki Inagaki, Kariya, and Hiroaki Maeda, Toyota, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Aug. 12, 1986, Ser. No. 895,825

Claims priority, application Japan, Aug. 26, 1985, 60-187850; Sep. 30, 1985, 60-216976

Int. Cl.[4] F15B *11/08*

U.S. Cl. 91—448 **5 Claims**

1. An oil pressure control system for power transmissions comprising:

an oil pressure source;

a regulator valve;

an inching valve;

a selector valve;

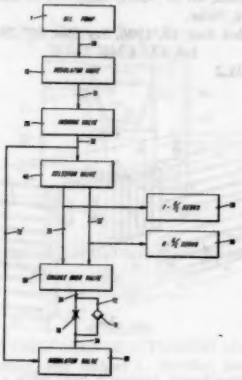
a change over valve;

a modulator valve;

at least one clutch servo;

a first oil passage for communicating said oil pressure source with said selector valve via said regulator valve and said inching valve;

a second oil passage for communicating said selector valve with said change over valve and said at least one clutch servo;



a third oil passage for communicating said change over valve with a first end of said modulator valve; and

a fourth oil passage for communicating said first oil passage with a second end of said modulator valve.

4,706,550

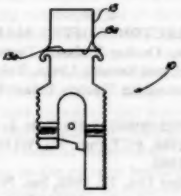
METAL MATRIX COMPOSITE PISTON HEAD AND METHOD OF FABRICATION

David M. Bullat, Carlsbad, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 9, 1986, Ser. No. 817,302

Int. Cl.[4] F16J *1/00, 1/04*; B23P *15/10*

U.S. Cl. 92—260 **4 Claims**



1. In a torpedo having hot working gases therein displacing at least one reciprocating aluminum piston, an improvement thereof is provided comprising:

a metal matrix composite piston head inertially welded onto the aluminum piston, the piston head having an aluminum-silicon carbide fiber composition.

3. A method of improving the heat resistance and life expectancy of an aluminum piston comprising:

mixing a metal matrix composite of silicon carbide fibers to powdered aluminum;

press-forming the mixed metal matrix composite to a piston head billet form having diameter at least the same as the aluminum piston; and

impact welding the metal matrix composite piston head onto the aluminum piston.

4,706,551

ENCLOSURE

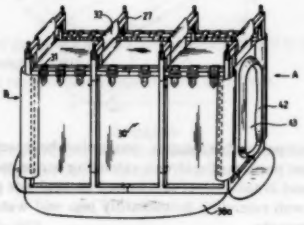
Paul S. Schofield, Lion Works, Low Whitehouse Row, Leeds 10, West Yorkshire, United Kingdom

Filed Sep. 19, 1985, Ser. No. 777,592

Claims priority, application United Kingdom, Sep. 20, 1984, 8423820; Feb. 14, 1985, 8503833

Int. Cl.[4] F24F *7/007*

U.S. Cl. 98—1 **10 Claims**



1. A multi-chamber enclosure for use in a hazardous environment and which comprises:

an external frame;

a flexible cover suspended from and arranged within the frame so as to form a roof, side and end walls of the enclosure;

a first closable opening formed in the cover at one end wall of the enclosure through which an operative may pass between the enclosure and a surrounding clean environment;

a second closable opening formed in the cover at an opposite end wall of the enclosure through which an operative may pass between the enclosure and an adjacent hazardous environment;

a sealing arrangement provided on said opposite end wall for sealingly communicating said second opening with the hazardous environment;

a vent in said one end wall to permit air to be drawn from the clean environment and through the enclosure to said opposite end wall;

a flexible partitioning wall arranged within the enclosure to define two separate chambers therein, said partitioning wall including side portions each secured to a respective side wall of the enclosure and defining therebetween an access opening between the chambers; and

a freely suspended flexible door flap arranged to close said access opening and located on the downstream side of said partitioning wall, the door flap being movable in a direction away from the partitioning wall in order to uncover said access opening and to allow air to be drawn through the enclosure and being returnable to its closing position when air is no longer drawn through the enclosure.

4,706,552

FURNACE REGISTER HUMIDIFIER

James Maguire, 17242-59A Avenue, Surrey, British Columbia, V3S 5S5, Canada

Continuation-in-part of Ser. No. 696,414, Jan. 1, 1985, abandoned. This application Apr. 22, 1985, Ser. No. 725,586

Int. Cl.[4] F24F *7/00*

U.S. Cl. 98—30 **4 Claims**

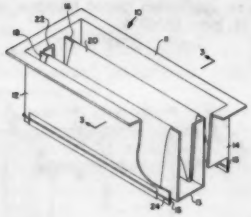
1. A forced air furnace register humidifier, comprising:

(a) a substantially rectilinear body adapted for placement in a furnace duct outlet, having a pair of opposed side walls, a pair of end walls and a generally open top;

(b) means for supporting said body from a perimeter of a floor furnace duct outlet;

(c) two parallel troughs for holding water formed in the interior of said body and having bottom and side walls;

(d) an air flow channel formed centrally in said rectilinear body between said parallel troughs to allow passage of the air forced from said furnace; and



(e) an air-permeable, porous, water-absorbent web, a raised central portion of said web extending across said air flow channel in the path of said forced air, and side portions of said web extending downwardly into said water-containing troughs.

4,706,553

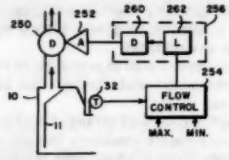
FUME HOOD CONTROLLER

Gordon P. Sharp, Newton; William P. Curtiss, Winthrop, and George B. Yundt, Cambridge, all of Mass., assignors to Phoenix Controls Corp., Boston, Mass.

Continuation-in-part of Ser. No. 586,007, Mar. 5, 1984, Pat. No. 4,528,898. This application May 8, 1985, Ser. No. 732,205

Int. Cl.[4] B08B *15/02*

U.S. Cl. 98—115.3 **26 Claims**



1. A fumed hood controller for controlling the air flow through a fume hood to maintain a relatively constant face velocity through a fume hood opening as the fume hood sash is moved, comprising:

transducer means responsive to the position of the fume hood sash for producing a sash opening signal the value of which is a substantially continuous and monotonic function of the sash opening;

air flow control means, responsive to an air flow signal, for varying the air flow through the fume hood in accordance with the air flow signal;

flow control means, responsive to the sash opening signal, for producing the air flow signal, including:

means for setting a first air flow at a first sash position;

means for setting a second air flow at a second sash position; and

means for providing, to the air flow means, an air flow control signal having a value so as to maintain the air flow through the hood substantially proportional to the sash opening area as the sash is moved between the first and second sash positions, said means for providing including means for maintaining a linear relationship between the air flow signal and the air flow through the hood.

4,706,554

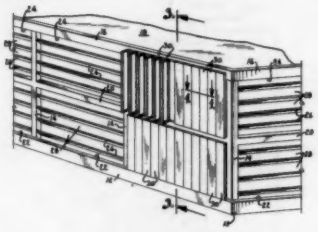
VERTICAL LOUVER SYSTEM FOR COOLING TOWERS

Micheal Baldino, Omaha; Robert L. Voss, and Larry L. Hladik, both of Fremont, all of Nebr., assignors to Kelly Industries, Inc., Fremont, Nebr.

Filed Aug. 15, 1986, Ser. No. 897,394

Int. Cl.[4] F24F *13/08*

U.S. Cl. 98—121.2 **18 Claims**



1. In a cooling tower having a base with a curb thereon presenting a top surface, vertical columns and horizontal beams defining openings each fitted with fixed horizontal slats extending between the columns, the improvement comprising:

a plurality of substantially vertical louvers for each opening;

means for mounting said louvers side by side in extension between the beams in a manner permitting each louver to pivot about a substantially vertical axis between an open position and a closed position, said louvers cooperating in the closed position to substantially cover the opening and presenting spaces for the ingress of air between adjacent louvers in the open position; and

said mounting means including for each louver a plate secured to the top surface of the curb, a pin projecting generally upwardly from said plate and connecting the louver to the plate, a bracket secured to the beam above the curb, and a fastener connecting the louver to the bracket, said fastener being aligned above the pin to establish said pivot axis about which the louver can pivot between the open and closed positions.

4,706,555

ELECTRIC COFFEE MAKER

Toshio Nakamura, Osaka; Tadashi Tamura, Hyogo; Naomi Kimura, Ibaraki, and Susumu Urata, Takatsuki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

PCT No. PCT/JP85/00590, § 371 Date Jun. 23, 1986, § 102(e) Date Jun. 23, 1986, PCT Pub. No. WO86/02816, PCT Pub. Date May 22, 1986

PCT Filed Oct. 22, 1985, Ser. No. 881,035

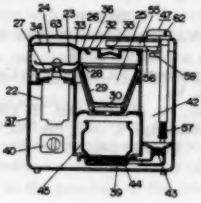
Claims priority, application Japan, Nov. 5, 1984, 59-232633; Nov. 5, 1984, 59-232634; Nov. 5, 1984, 59-232635; Nov. 5, 1984, 59-232636

Int. Cl.[4] A47J *31/42*

U.S. Cl. 99—283 **8 Claims**

1. An electric coffee maker comprising a material grinding compartment having a cutter adapted to be drivingly rotated by a driving motor provided in a coffee maker body; a filtering compartment provided side by side with and communicated with said material grinding compartment; a tank for containing water; a heater section for heating water supplied from said tank; and a change-over means for performing a change-over action such that water from said tank, having been heated by the heater section, is circulated back to said tank, through said change-over means or is supplied to said filtering compartment, said change-over means being constructed to chage over to supplying of hot water to said filtering compartment from

circulation to said tank by means of a thermal responsive member which acts in response to a temperature of hot water when



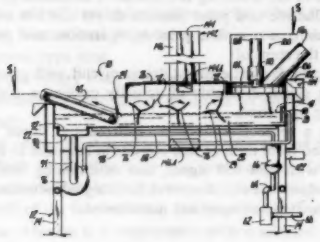
the hot water contained in said tank reaches a boiling temperature.

4,706,556

POTATO CHIP MANUFACTURING MACHINE

Joseph E. Wallace, and Robert L. Shaffer, both of Creston, Iowa, assignors to Vanmark Corporation, Creston, Iowa

Filed Jan. 13, 1986, Ser. No. 818,609
Int. Cl.[4] A47J *37/12*
U.S. Cl. 99—330 **9 Claims**



1. In a machine for manufacturing potato chips, said machine comprising, a frame, an elongated cooking oil container on said frame, a potato slicing means secured to the upper portion of a first end of said container, fluid flow means operatively connected to said cooking oil container to cause cooking oil to flow in said container from said first end toward a second end of said container, a potato chip discharge means mounted on said second end of said container, and heating means on said frame to heat oil in said container to cook potato slices deposited therein; the improvement comprising,

heat tranfer means on the exterior bottom of said container adjacent said heating means to enhance the uniform conduction of heat from said heating means to said container,

said heat transfer means comprising a plurality of spaced apart solid bars adjacent the entire bottom of said container.

4,706,557

CROSS FLOW CONTINUOUS FRYER

Chung L. Feng, Overland Park, Kans., and Ching-Wen Yang, Raytown, Mo., assignors to Manley, Inc., Kansas City, Mo.

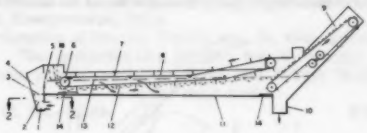
Filed Jul. 9, 1986, Ser. No. 884,210
Int. Cl.[4] A47J *37/12*
U.S. Cl. 99—355 **4 Claims**

1. A cross flow continuous fryer comprising

means to contain a bath of oil,

means to distribute oil flow within said container means,

a tilted continuous belt with flights which act to both move a product and to control flow of said oil within said container,



a series of dams within said container which act to shape the oil passages, and

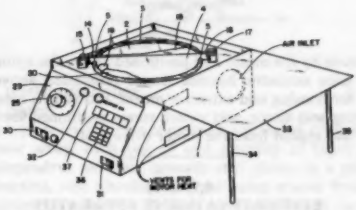
means to remove said product from said fryer.

4,706,558

HOME CHOCOLATE PROCESSING APPARATUS

Francis H. Snyder, Jr., 31 Cannon Dr., Danbury, Conn. 06811

Filed Nov. 7, 1985, Ser. No. 796,000
Int. Cl.[4] A23G *1/00*
U.S. Cl. 99—455 **5 Claims**



1. Chocolate making apparatus, comprising a casing;

a bowl removably mounted in said casing for accommodating a coating;

moving means in said casing coupled to said bowl for rotating said bowl;

heating means in said casing in operative proximity with said bowl for melting said coating;

cooling means in said casing in operative proximity with said bowl for cooling said coating; and

control means electrically connected to said heating means and said cooling means for controlling the heating and cooling of said coating, and wherein said moving means includes bearing means having a cavity of predetermined geometric configuration and an electric motor coupled to said bearing means and wherein said bowl has a pin extending from the bottom thereof and removably seated in said cavity whereby said motor rotates said bowl when said motor is energized.

4,706,559

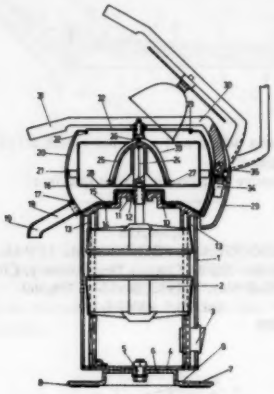
HIGHLY RELIABLE JUICE EXTRACTOR

Luis C. O. De Zarate, San Sebastian, Spain, assignor to Sammic, S.A., Paseo de la Castellana, Spain

Filed Mar. 27, 1986, Ser. No. 844,873
Claims priority, application Spain, Dec. 16, 1985, 291063; Dec. 16, 1985, 291064
Int. Cl.[4] A23N *1/00*
U.S. Cl. 99—504 **10 Claims**

1. A juice extractor, comprising in combination, an extruded, open top cylindrical body having an axis and having a closed bottom cover; an electric activating motor positioned within said cylindrical body and including a motor drive shaft; a base attached to the bottom cover and including a cup shaped center portion having a generally circular lower flange extending therefrom outwardly beyond said cylindrical body and spaced axially from said bottom cover, said flange including

friction pads on a lower surface, the cup shaped portion of the stand defining an annular recess for winding up and storing various lengths of an electric cable for connecting the motor to an electric main supply; juice extractor means connected with



and driven by the motor and positioned above the cylindrical body; juice extractor housing means positioned above said motor for housing said extractor means; and switch means for activating said motor, said switch means positioned above the motor and spaced from the motor drive shaft.

4,706,560

REFUSE TREATMENT APPARATUS

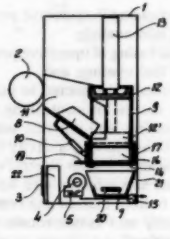
Gaetano Capodicasa, Via Torrenuova,23, 97100 Ragusa, Italy

Filed Feb. 13, 1986, Ser. No. 829,399

Claims priority, application Italy, Feb. 21, 1985, 19590 A/85

Int. Cl.[4] B30B *15/34*

U.S. Cl. 100—102 **2 Claims**



1. Apparatus for the treatment of domestic refuse operating to convert said refuse into a solid, odourless and non putrefiable residue of reduced weight and volume, said apparatus comprising:

a sealable casing having a loading door for the introduction of refuse, and a lower door for the withdrawal of residues obtained after treatment,

an upright process cylinder housed in said casing, said process cylinder having an upper part and a lower part,

a compacting piston in said process cylinder for compacting refuse introduced therein,

electric resistance heater means energizable for raising the temperature within the process cylinder to a first temperature level such as to vaporize any liquids contained in said refuse and to a second temperature level, lower than said first level, to dry the atmosphere inside said apparatus, and

extractor means in said housing for removing vapors, gases and fumes generated upon incineration of said refuse, said extractor means being energized as said loading door is opened to maintain the interior of said apparatus under vacuum through the overall operating cycle thereof.

4,706,561

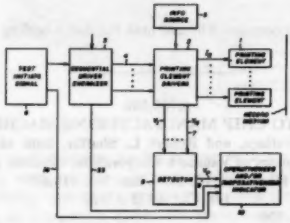
PRINTING ACTIVATOR TEST CIRCUIT GENERATING BACK EMF

Jerry L. Greer, Waynesboro, Va., assignor to Genicom Corporation, Waynesboro, Va.

Continuation of Ser. No. 664,878, Oct. 25, 1984, abandoned. This application Apr. 8, 1986, Ser. No. 850,436

Int. Cl.[4] B41J *9/38*

U.S. Cl. 101—93.01 **5 Claims**



4. A method for detecting the operative condition of a plurality of inductive coil print element driver circuits without actually causing a complete printing operation, said method comprising the steps of:

energizing each print element driver circuit with an electrical test signal incapable of actually causing a complete printing operation,

detecting a respective reverse electromotive force signal produced from each of said circuits in response to energization with said test signal; and determining from said detected reverse electromotive force signals whether each said circuit is not open and not-shorted.

4,706,562

PRINTING MECHANISM HAVING ONE ELECTROMAGNETIC SELECTOR FOR TWO TYPE RINGS

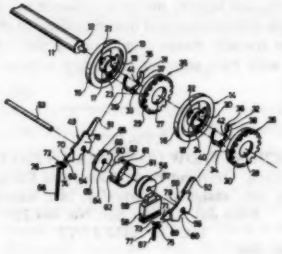
Fumihisa Hori, Tamayama, Japan, assignor to Alps Electric Co., Ltd., Japan

Filed Jan. 17, 1986, Ser. No. 820,552

Claims priority, application Japan, Jan. 17, 1985, 60-4851; Jan. 17, 1985, 60-3619[U]; Jan. 17, 1985, 60-3623[U]

Int. Cl.[4] B41J *1/48*

U.S. Cl. 101—93.22 **2 Claims**



1. A printing mechanism comprising:

a first rotary shaft;

a first type ring mounted on the first rotary shaft and pro-

vided on its circumference with a plurality of first typefaces;

a first selection ratchet wheel on the first rotary shaft rotatable together with the first type ring and provided on its circumference with a plurality of first teeth corresponding to the position of the first typefaces, respectively;

a second type ring mounted on the first rotary shaft beside the first type ring and provided on its circumference with a plurality of second typefaces;

a second selection ratchet wheel on the first rotary shaft rotatable together with the second type ring and provided on its circumference with a plurality of second teeth corresponding to the positions of the second typefaces, respectively;

drive means engageable between the first rotary shaft and the first and second type rings for driving the type rings together in rotation when they are in a waiting state;

said first type ring and said first selection ratchet wheel and said second type ring and said second selection ratchet wheel being disposed in the waiting state such that the phase of the first teeth are shifted relative to that of the second teeth;

a first driving pawl mounted between said first type ring and said first selection ratchet wheel for transmitting a rotational force of said first rotary shaft to said first type ring;

a second driving pawl mounted between said second type ring and said second selection ratchet wheel for transmitting a rotational force of said first rotary shaft to said second type ring;

a second rotary shaft in parallel with the first rotary shaft;

an electromagnetic clutch mounted on said second rotary shaft;

a first engagement pawl mounted on the second rotary shaft which is movable upon one energization of said clutch from a first position wherein it is not engaged with the teeth of the first selection ratchet wheel to a second position wherein it is engageable with a selected one of the teeth of the first selection ratchet wheel for stopping the first type ring rotated on the first rotary shaft at a position corresponding to a selected typeface thereon, wherein upon stopping said first type ring, said first driving pawl becomes disengaged from transmitting the rotational force of said first rotary shaft to said first type ring;

a second engagement pawl mounted on the second rotary shaft which is movable upon said one energization of said clutch from a first position wherein it is not engaged with the teeth of the second selection ratchet wheel to a second position wherein it is engageable with a selected one of the teeth of the second selection ratchet wheel for stopping the second type ring at a position corresponding to a selected typeface thereon, wherein upon stopping said second type ring, said second driving pawl becomes disengaged from transmitting the rotational force of said first rotary shaft to said second type ring;

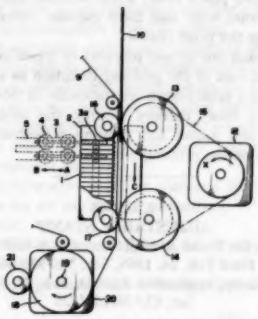
wherein upon a single energization of the electromagnetic clutch to move both the first and second engagement pawls to their second positions, one of the two pawls becomes engaged with the teeth of its respective selection ratchet wheel and the other pawl is kept not engaged with the teeth of its respective selection ratchet wheel due to the shifted phases of the teeth of the selection ratchet wheels, whereby said one electromagnetic clutch is selectively energizable to control the positioning of the typefaces of the two type rings.

4,706,563

CARD PRINTER BY MEANS OF A CARD FEEDING AND TYPE SELECTING PRINTING METHOD

Takahide Kazui, No. 2543, Imajuku-cho, Asahi-ku, Yokohama-shi, Kanagawa-ken, Japan

Continuation of Ser. No. 770,072, Aug. 28, 1985, abandoned.
This application Oct. 23, 1986, Ser. No. 924,182
Claims priority, application Japan, Mar. 2, 1984, 59-40068
Int. Cl.[4] B41J 1/08
U.S. Cl. 101—93.43 4 Claims



1. A printer comprising:

(a) a platen;

(b) a type receiving case containing a plurality of types in a linear array, each one of said plurality of types being independent movable towards said platen in a printing direction, said plurality of types being spaced from one another by a uniform distance corresponding to the pitch of the symbols to be printed;

(c) first means for independently driving each one of said plurality of types in the printing direction, said first means comprising:

(i) a plurality of driving armatures, each one of said plurality of driving armatures being operatively connected to a corresponding one of said plurality of types;

(ii) a plurality of solenoids, each one of said plurality of solenoids being operatively connected to a corresponding one of said plurality of driving armatures; and

(iii) a plurality of armature springs, each one of said plurality of armature springs being operatively connected to a corresponding one of said plurality of driving armatures;

(d) second means for incrementally feeding a printing medium between said platen and said type receiving case in stepwise fashion in a direction perpendicular to the printing direction of said plurality of types, said second means feeding the printing medium one pitch distance, then stopping the printing medium, then feeding the printing medium by another pitch distance, and so on, said second means comprising:

(i) a first pulse motor;

(ii) a first capstan roller mounted upstream of said type receiving case;

(iii) a second capstan roller mounted downstream of said type receiving case;

(iv) a timing belt driven by said first pulse motor and operatively connected to said first and second capstan rollers;

(v) a first pinch roller sized, shaped, and positioned to cooperate with said first capstan roller to drivingly engage the printing medium; and

(vi) a second pinch roller sized, shaped, and positioned to cooperate with said second capstan roller to drivingly engage the printing medium; and

(e) third means for incrementally feeding a print ribbon in stepwise fashion between said plurality of types and a

printing medium fed by said second means, said third means feeding the print ribbon by the same pitch distance, then stopping the print ribbon, then feeding the print ribbon by another pitch distance, and so on, said third means comprising:

(i) a second pulse motor operated independently of said first pulse motor;

(ii) a third capstan roller operatively connected to said second pulse motor; and

(iii) a third pinch roller sized, shaped, and positioned to cooperate with said third capstan roller to drivingly engage the print ribbon,

whereby each one of said plurality of types can be independently driven in the printing direction as a printing medium and a print ribbon are stationary in front of said type receiving case, thereby forcing the printing medium against said platen and printing a desired sequence of symbols on the printing medium.

4,706,564

ADJUSTABLE STAMP

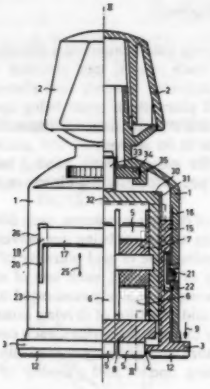
Karl Skopek, Dr. Franz Arming Strasse 5, A-4600 Wels, Austria

Filed Feb. 24, 1986, Ser. No. 833,060

Claims priority, application Austria, Feb. 22, 1985, 538/85

Int. Cl.[4] B41J *1/20*

U.S. Cl. 101—111 **7 Claims**



1. In an adjustable stamp having a housing, a frame plate having a window therein, at least one loop-shaped adjustable type belt having printing characters projecting therefrom and guided by an adjustment wheel and a support strip, the adjustable type selected for printing being disposed on the support strip and projecting through said window of said frame plate, said frame plate including a printing plate for producing an imprint surrounding the imprint of the adjustable type and being supported on the housing of the stamp so that it is displaceable vertically with respect to its plane, the improvement comprising:

guide strips connected to said frame plate on each side of the window, said guide strips being displaceable vertically with respect to the plane of the frame plate and slidably guided in the interior of the housing so that said frame plate is displaceable from a first printing position, in which position a type of the type belt projects through the window into a second, extended position, in which said type belt is freely adjustable; and

manipulating means projecting outwardly through said housing connected to said guide strips for displacing said guide strips.

4,706,565

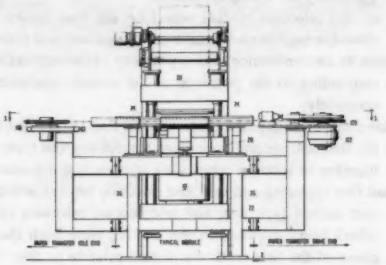
MULTI-COLOR ENGRAVING SYSTEM

John Martin, 10200 W. Bellfort 807-F, Houston, Tex. 77031; Ronald W. White, 21615 Greengate Dr., Spring, Tex. 77388, and Johnnie L. White, Jr., 210 Gleneagles Dr., Conroe, Tex. 77385

Filed May 27, 1986, Ser. No. 867,042

Int. Cl.[4] B41F *1/00, 1/46*

U.S. Cl. 101—151 **8 Claims**



1. In an engraving press the combination comprising: a frame;

a fixed platen supported in said frame;

upper and lower movable platens on opposite sides of and parallel to said fixed platen;

a plurality of tie rods extending through bearings in said fixed platen and secured at opposite ends to said upper and lower movable platens;

a main hydraulic cylinder rigidly supported from the underside of said fixed platen;

a piston within said cylinder;

a piston rod rigidly connecting said piston and said lower movable platen; whereby the assembly of said movable platens and tie rods may be reciprocated in a vertical plane with respect to said fixed platen;

a die plate assembly mounted for horizontal sliding movement over the upper surface of said fixed platen;

a striker assembly carried by the under surface of said upper movable platen for cooperation with a die carried by said die plate to engrave work pieces positioned therebetween; and

hydraulic means operating in timed relation with said main hydraulic cylinder for reciprocating said die plate in a horizontal plane over said upper platen between engraving, inking and wiping positions.

4,706,566

METHOD OF RECONNECTING DRIVE SHAFT SECTIONS IN PHASE IN A WEB PRINTING PRESS HAVING A PRINT STATION AND A PERFORATING OR LIKE PROCESSING STATION

Toshiaki Kishine; Hideo Izawa, both of Yachiyo, and Masaru Ohba, Funabashi, all of Japan, assignors to Miyakoshi Printing Machinery Co., Ltd., Tokyo, Japan

Filed Feb. 12, 1986, Ser. No. 828,516

Int. Cl.[4] B41F *5/04*

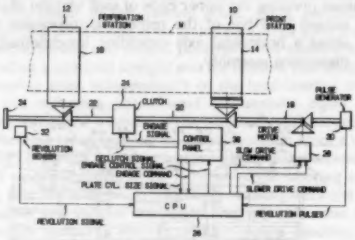
U.S. Cl. 101—426 **6 Claims**

1. In a web printing press wherein a continuous web of material is fed through a print station and a processing station driven by first and second drive shaft sections, respectively, which are normally held interconnected for joint rotation and which are disconnected by a clutch to allow the print station to operate independently of the processing station, a method of reconnecting the two drive shaft sections in phase through the clutch which comprises:

(a) counting the number of revolutions of the first drive shaft

section after the same is declutched from the second drive shaft section;

(b) computing, when a clutch engage command is generated, the additional number of revolutions which the first drive shaft section must make before being reconnected in phase to the second drive shaft section;



(c) reducing the revolving speed of the first drive shaft section when the clutch engage command in generated; and

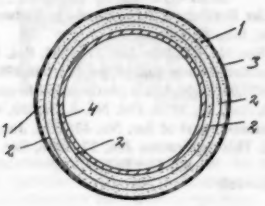
(d) causing the clutch to be engaged when the first drive shaft section completes the additional number of revolutions.

4,706,567

EXPLOSIVE CHARGES

Hermann Schmid; Per Sjöberg, both of Karlskoga, and Leif Svensson, Karlshamn, all of Sweden, assignors to Nobel Kemi AB, Karlskoga, Sweden

Filed Jun. 20, 1986, Ser. No. 876,446
Claims priority, application Sweden, Jun. 20, 1985, 8503080-7
Int. Cl.[4] F42B *3/00*
U.S. Cl. 102—318 **26 Claims**



1. A method of producing annular charges for explosive jointing of large-diameter pipes which comprises

winding and joining strip-shaped, elastically deformable, flat explosive to form a circular ring of plural layers of uniform thickness having the desired outer diameter and thus forming a plurality of closely abutting layers to thereby produce said annular charges.

4,706,568

CHEMILUMINESCENT MARKING WARHEAD

Neal M. Lundwall, and Donald Herigstad, both of Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy

Filed Jun. 9, 1986, Ser. No. 874,311
Int. Cl.[4] F42B *13/36*
U.S. Cl. 102—513 **3 Claims**

1. A chemiluminescent marking system comprising:

housing means having smooth interior walls;

slidable closure means located at one end of said housing means and in engagement with said interior walls of said housing means;

a plug means releaseably attached to said housing means at an end thereof remote from said slidable closure means;

a plurality of chemiluminescent radiant energy sources within said housing between said plug means and said slidable closure means, each of said chemiluminescent radiant energy sources being characterized by having;

a flexible outer wall containing a component chemical of a chemiluminescent reaction, and

a frangible inner vessel containing another component of said chemiluminescent reaction, where

by flexure of said outer wall causes rupture of said frangible inner vessel to initiate said chemiluminescent reaction, and

means to move said slidable closure means toward said plug means to cause separation of said plug means to release said chemiluminescent radiant energy sources in such a manner to cause flexure of said outer wall to start said chemiluminescent reaction.

3. A chemiluminescent marking warhead for providing a night reference for air navigation, comprising:

a rocket motor;

a hollow tubular housing configured for attachment to said rocket motor;

an explosive charge within said housing adjacent said rocket motor;

a fuze attached to one end of said housing for initiating said warhead in response to predefined conditions;

a bulkhead closing one end of said housing supporting and adjacent to said fuze and attached to said housing by shearable means;

a piston mounted over said explosive charge and sealingly contacting the inner walls of said housing;

a first plurality of liners disposed in said housing in contact with said piston and defining a first compartment;

a first plurality of elongated chemiluminescent 20 light sticks, each having a frangible inner container containing a first chemical and a second flexible container containing said first container and a second chemical, said first plurality of light sticks being disposed in said first compartment;

a slidable bulkhead disposed in said housing in contact with said first plurality of liners;

a second plurality of liners disposed in said housing in contact with said slidable bulkhead and defining a second compartment; and

a second plurality of elongated chemiluminescent light sticks identical in construction to said first plurality of light sticks and disposed in said second compartment, whereby initiation by said fuze causes said explosive charge to propel said piston toward the front of said housing, shearing the bulkhead and expelling the lightsticks into the airstream where they are caused to flex, rupturing the first container and activating the lightsticks which provide an illuminated reference marking.

4,706,569

ARMOR BREAKING PROJECTILE

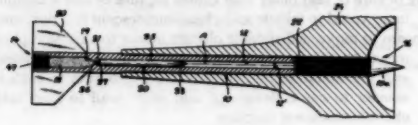
Peter Wallow, Düsseldorf, and Bernhard Bisping, Ratingen, both of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Dusseldorf, Fed. Rep. of Germany

Continuation of Ser. No. 295,551, Jul. 27, 1981, abandoned, which is a continuation-in-part of Ser. No. 213,171, Nov. 26, 1980, abandoned. This application Nov. 9, 1984, Ser. No. 701,431

Claims priority, application Fed. Rep. of Germany, Dec. 3, 1979, 2948542

Int. Cl.[4] F42B *11/06*

U.S. Cl. 102—518 7 Claims



1. A composite projectile for armored targets, especially active-armor and multilayer-armor targets, comprising:

an elongated subcaliber main projectile body of substantially uniform diameter over its length forming an armorbreaking inertial impact element which is fired at an armored target, said main body being provided with a detachable sabot and stabilizing fins;

a single solid elongated auxiliary projectile body of substantially uniform diameter over its length received in said main projectile body and forming an inertial impact element adapted to break armor of said target, said main projectile body being substantially longer than said auxiliary projectile body;

a proximity fuse on said main body adapted to respond to approach of the composite projectile to said target; and

a propellant charge in said main projectile for firing said auxiliary projectile body therefrom in response to said proximity fuse whereby, as said projectile approaches said target and at a predetermined distance therefrom, said auxiliary projectile body is fired from said main projectile body and impacts said target whereupon said main projectile body impacts said target in the same region, said main projectile body being formed with a single axially extending central bore having a diameter corresponding to that of a portion of said auxiliary projectile body and of a length exceeding that of said auxiliary projectile body, said auxiliary projectile body being received in said bore at a rear portion thereof and being guided therein upon firing from said main projectile body, said charge being disposed in a chamber formed in said main projectile body at a rear end thereof communicating with said bore.

4,706,570

CRANE WITH ANTI-SKEWING DEVICE

Dominik J. Moro, Mt. Wolf; Robert R. Reisinger, York; James M. Larson, York, and Roscoe E. Kuhn, York, all of Pa., assignors to Acco Babcock Inc., Fairfield, Conn.

Filed Jul. 17, 1985, Ser. No. 756,388

Int. Cl.[4] B61D *1/00;* E04G *3/14;* B66C *11/02;* H02P *5/46*

U.S. Cl. 105—163.2 7 Claims

1. A crane for use under a bridge which extends longitudinally and has transversely spaced rails on the underside, said crane comprising

a platform adapted to be suspended below and extend transversely of the bridge,

a suspension assembly adjacent each end of said platform,

each suspension assembly comprising a pair of longitudinally spaced trolleys having wheels adapted to engage its respective rail,

a motor associated with one set of trolleys of each suspension assembly for driving the respective suspension assembly along its respective rail,

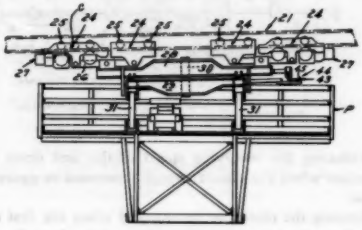
a first load bar interconnecting the pair of trolleys of each suspension assembly,

a second load bar associated with each suspension assembly,

means pivotally interconnected to the second load bar to the first load bar of each suspension assembly about a vertical axis,

each suspension assembly also including longitudinally spaced vertical shaft having an upper end and a lower end,

means pivoting the upper ends of said vertical shafts to the second load bar of the respective suspension assembly about a horizontal axis extending longitudinally of the suspension assembly,



means pivoting the lower ends of said vertical shafts to the platform about a horizontal axis extending longitudinally of the respective suspension assemblies,

means for sensing the relative angular skewing movement of the second load bar relative to the first load bar resulting from relative longitudinal movement between the suspension assemblies; and

means for driving the motors in response to a predetermined relative angular skewing movement to eliminate the angular skewing movement.

4,706,571

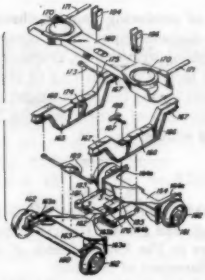
SELF-STEERING TRUCKS

Harold A. List, Bethlehem, Pa., assignor to Railway Engineering Associates, Inc., Bethlehem, Pa.

Division of Ser. No. 623,189, Jun. 21, 1984, Pat. No. 4,655,143, which is a continuation-in-part of Ser. No. 948,878, Oct. 5, 1978, Pat. No. 4,455,946, which is a continuation-in-part of Ser. No. 608,596, Aug. 28, 1975, Pat. No. 4,131,069, which is a continuation-in-part of Ser. No. 438,334, Jan. 31, 1974, abandoned. This application Jun. 27, 1986, Ser. No. 823,081

Int. Cl.[4] B61D *1/00*

U.S. Cl. 105—168 6 Claims



1. A truck assembly for use with a railway vehicle on which the truck is adapted to be mounted, the truck assembly comprising two axle-borne wheelsets, load-bearing truck framing pivotally movable about a vertical axis with respect to the

vehicle body, a steering arm for each wheelset movable with the wheelset with respect to the framing in the steering sense, each steering arm having load-bearing side portions with axle bearings movable with respect to the framing in the steering sense under the influence of yawing forces, each steering arm having a central portion movable with the side portions and extended from the side portions to a zone substantially midway between the axles of the wheelsets, the side and central portions of each steering arm being rigidly interconnected for conjoint movement in the yawing sense, pivot mechanism interconnecting the steering arms including a pivot joint in said zone interconnecting said central portions of the steering arms and providing a common upright axis for relative yaw motions of the steering arms independently of the load-bearing truck framing and enforcing coordinated substantially equal and opposite steering yaw motions of the wheelsets with respect to the load-bearing truck framing in either direction from a central position in which the wheelsets are parallel, and means for resiliently resisting steering yaw motions of the steering arms including first resilient means yieldingly reacting between the truck framing and at least one of the steering arms, and said means further including second resilient means reacting between the steering arms independently of the truck framing and yieldingly opposing said coordinated equal and opposite steering motions of the steering arms.

4,706,572

ARRANGEMENT OF WORK LOCATIONS

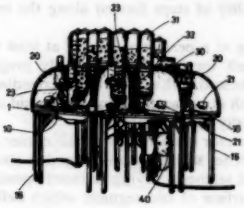
Wolfgang Priesemuth, Postkamp 13, D-2210 Itzehoe-Nordoe, Fed. Rep. of Germany

Filed Oct. 25, 1985, Ser. No. 791,221

Claims priority, application Fed. Rep. of Germany, Feb. 20, 1985, 3505763

Int. Cl.[4] A47B *57/00*

U.S. Cl. 108—60 **5 Claims**



1. Am arrangement of work locations for the mass producion of small, complex units, said arrangement having improvement in combination therewith comprising:

a table having a periphery as well as a center and having a basically ring-shaped table top that is divided into individual sectors, each of which provides one of said work locations about the periphery of said table; the center of said table being provided with a region that is free of said table top; and supply lines, such as for power, lighting, gas, air, water, discharge, gas venting, etc, disposed in said central region for all of said work locations; said table including a plurality of essentially identically-shaped work tables each having a trapezoidal table top that includes slanted edges which abut one another to form said ring-shaped configuration; and said work tables being disposed around said open central region to delimit said open central region;

said arrangement further including a portion of a climate-control device disposed in said central region of said table, said climate-control device including suction lines for solder vapors; said arrangement, for defining said individual work locations, further including vertically upwardly projecting, radially directed partitions on said table top; material-transfer openings provided in said partitions to establish communication between adjacent ones of said work locations, said partitions being made of transparent plastic material;

a shelf that covers said central region of said table; said partitions having upper edges remote from said table top, with said shelf being supported on said upper edges;

supply bins, for small parts, disposed on said shelf; and

conveying tubes connected to said supply bins and leading to individual ones of said work locations to provide communication between the bins and the work locations.

4,706,573

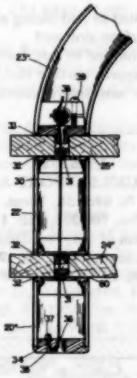
MODULAR FURNITURE CONSTRUCTION

Ulrich Sielaff, 118 Vaughn Ct., Madison, Wis. 53705

Filed Sep. 30, 1985, Ser. No. 781,482

Int. Cl.[4] A47B *3/00*

U.S. Cl. 108—111 **7 Claims**



1. Modular shelf connector means comprising

(a) at least one elongated shelf spacing member configured with an opening extending substantially axially therethrough,

(b) an elongated multi-stranded cable tension member disposed through said spacing member within said opening,

(c) anchor means fixedly connected to said cable tension member coaxially rotatively biasable together therewith to twist multiple strands of said cable tension member,

said connector means utilized by said spacing member being disposed substantially perpendicularly extending between facing surfaces of shelving to be connected in a stack, and aligned with holes through such shelving with said anchor means disposed outboard of said shelving substantially axially aligned with said spacing member and with said cable tension member disposed through said spacing member and shelving and connected to said anchor means wherein said anchor means is rotated coaxially with said tension member to draw said tension member taut and secure said spacing member and shelf into tightly abutting contact.

4,706,574

LOCKING REMOVABLE SUPPORT SURFACE AND ADAPTER

Robert L. Mason, 18724 Via Verona, Newport Beach, Calif. 92715

Filed Oct. 22, 1986, Ser. No. 922,024

Int. Cl.[4] A47B *57/00, 5/00*

U.S. Cl. 108—97 **11 Claims**

1. A locking removable support surface with adapter, comprising:

said adapter having:

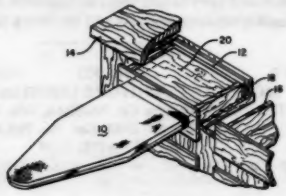
a facing having a support surface slot therethrough having:

an upper slot surface,

a lower slot surface spaced from said upper slot surface,

a first end, and

a second end, spaced from said first end;



a first side wall coupled to said facing adjacent said first end of said support surface slot; and

a second side wall coupled to said facing adjacent said second end of said support surface slot; and

said support surface selectively insertable in said support surface slot.

4,706,575

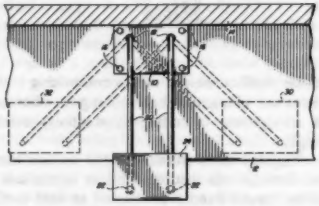
SWIVEL MOUNT SUPPORT APPARATUS

Jerry J. Hamlin, 2356 N. 64th St., Mesa, Ariz. 85205

Continuation of Ser. No. 700,396, Feb. 11, 1985, abandoned, which is a continuation of Ser. No. 350,625, Feb. 19, 1982, abandoned. This application Jan. 30, 1987, Ser. No. 9,016

Int. Cl.[4] A47B *13/08*

U.S. Cl. 108—102 **5 Claims**



3. A swivel mount support apparatus comprising:

a substantially rigid fixed mounting plate having first and second surface portions adapted to receive, respectively, first and second pivot cylinders;

a substantially horizontal rigid moveable support plate having downward facing third and fourth surface portions adapted to receive, respectively, third and fourth pivot cylinders, wherein said third and fourth surface portions are operably disposed at a higher elevation than said first and second surface portions;

first and second smooth bore hollow pivot cylinders vertically oriented and fixed in a parallel fashion, respectively, to said first and second surface portions of said mounting plate, and located a predetermined distance apart and having first and second upward pointing open ends;

third and fourth smooth bore hollow pivot cylinders vertically oriented and fixed in a parallel fashion, respectively, to said third and fourth surface portions of said support plate, and located said predetermined distance apart and having third and fourth downward pointing open ends;

only first and second arms, each having a central portion and parallel end portions, wherein said end portions are disposed at each end of said central portion and of a size and shape to slide into said pivot cylinders and rotate freely therein, wherein said central portions are of substantially equal length exceeding said predetermined distance and are substantially horizontally arranged, wherein a first end portion of each arm is substantially vertically downwardly oriented and a second end portion of each arm is substantially vertically upwardly oriented; and

wherein downwardly oriented end portions of said arms are inserted in said upward pointing open ends of said first and second pivot cylinders and upwardly oriented end portions of said arms are inserted in said downward pointing open ends of said third and fourth pivot cylinders so that said arms are moveably parallel.

4,706,576

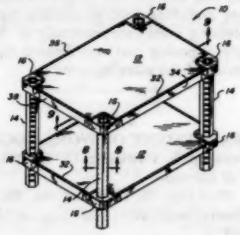
INTERLOCKING PLASTIC SHELVING SYSTEM

Barry A. James, 7720 S. Poplar Way, Englewood, Colo. 80012

Filed Mar. 27, 1986, Ser. No. 844,820

Int. Cl.[4] A47B *3/00*

U.S. Cl. 108—111 **24 Claims**



1. A shelving system comprising in combination:

an upright post of hexagonal transverse cross section including a plurality of steps formed along the length of said post;

a shelf having at a periphery thereof at least three corner notches each forming a downwardly projecting tooth integrally formed with said shelf and extending around the corner notch at a spaced distance from said shelf defining a downwardly open channel; and

a corner connector consisting of a male corner segment and a female corner segment mated together about said post, each of said segments having an insert opening formed in a mating surface of said segment which defines an aperture through said corner connector when the corner is formed by joining the male and female segments, each of said segmets with an upwardly projecting tooth extending along an inner surface of each segment, the upward tooth integral with the segment and adjacent to a second upwardly open channel for receiving said first mentioned tooth, said second channel receiving said downwardly projecting tooth of said shelf and said first channel of said shelf receiving said upwardly projecting tooth in an interlocking relationship between said shelf, said connector and said post, which insert opening fits about said post and connects said connector to said post at one of said steps.

4,706,577

SAFE DOOR LATCH DEFORMATION ACTUATED INTERLOCK

Pamela K. Jones, Emsworth, England, assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 855,861, Apr. 24, 1986, abandoned. This application Jun. 23, 1987, Ser. No. 67,409

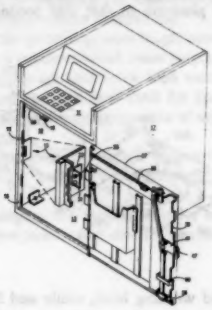
Int. Cl.[4] E05G *1/04*

U.S. Cl. 109—59 T **11 Claims**

1. An enclosure having sheet metal walls and a lockable sheet metal access door, said door having a latch which engages a wall of said enclosure to prevent opening said door, said latch being mounted for rotation on a lock mechanism for

opening said door, the improvement comprising: an interlock in said enclosure at an edge of said door;

said latch having a mating interlock at its wall engaging end



which is engaged by said interlock to prevent retraction of said latch when said lock mechanism and said latch mounted thereon are moved inwardly during an attack upon said enclosure.

4,706,578

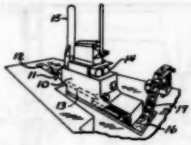
PULSATING INCINERATOR HEARTH

John N. Basic, Sr., 21 W. 161 Hill St., Glen Ellyn, Ill. 60137

Continuation of Ser. No. 362,853, Mar. 29, 1982, Pat. No. 4,475,469, which is a continuation-in-part of Ser. No. 248,054, Mar. 27, 1981, Pat. No. 4,438,705. This application Oct. 9, 1984, Ser. No. 659,849

Int. Cl.⁴ F23N *7/08*

U.S. Cl. 110—281 **41 Claims**



1. A material moving system comprising a fixed suspension frame and a superstructure suspended from said frame for limited arcuate movement of said superstructure relative to said frame, said superstructure including a central area thereon adapted to receive a pile of particles, and means for stroking and stopping movement of said superstructure relative to said frame to compel movement of said particles when arranged on said area responsive to each stroking and stopping of said superstructure, said superstructure having a yoke extending from one side thereof and said frame having a beam on each of opposed sides of said yoke defining predetermined positions for stroking and stopping movement of said superstructure relative to said frame.

4,706,579

METHOD OF REDUCING FIRESIDE DEPOSITION FROM THE COMBUSTION OF SOLID FUELS

Gene A. Merrell, Huntingdon Valley, Pa., assignor to Betz Laboratories, Inc., Trevose, Pa.

Filed Aug. 21, 1986, Ser. No. 899,188

Int. Cl.⁴ F23B *7/00*

U.S. Cl. 110—343 **15 Claims**

1. In a solid fuel fired combustion system of the type having a radiant section and a convection section wherein, in the absence of treatment, combustion residues emanating from said solid fuel tend to slag in said radiant section and to form fouling deposits in said convection section the method comprising inhibiting both said slagging and said fouling by adding to said solid fuel an effective amount for the purpose of a composition consisting essentially of a member or members selected from the group consisting of Cr_2O_3 and $CaCr_2O_4$.

4,706,580

PROCESS TO REHEAT FLUE GASES CLEANED BY THE WET PROCESS

Werner Lehnert, Quierschied, Fed. Rep. of Germany, assignor to Saarbergwerke Aktiengesellschaft, Fed. Rep. of Germany

PCT No. PCT/DE85/00528, § 371 Date Aug. 6, 1986, § 102(e) Date Aug. 6, 1986, PCT Pub. No. WO86/03824, PCT Pub. Date Jul. 3, 1986

PCT Filed Dec. 17, 1985, Ser. No. 897,070

Claims priority, application Fed. Rep. of Germany, Dec. 20, 1985, 3446511

Int. Cl.⁴ F23J *11/00, 15/00*

U.S. Cl. 110—345 **4 Claims**

1. Process to reheat flue gases originating in furnaces operated with fossil fuels cleaned by a wet cleaning process before the cleaned flue gases are introduced into a chimney, comprising,

generating the heat energy required to be added to the cleaned flue gases in a secondary furnace, wherein the secondary furnace is a fluidized bed furnace.

4,706,581

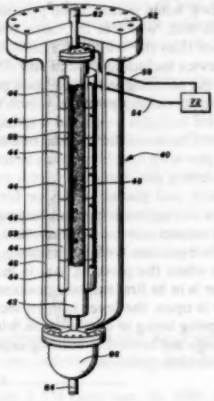
FOSSIL FUEL FURNACE REACTOR

William J. Parkinson, Los Alamos, N. Mex., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 31, 1986, Ser. No. 925,598

Int. Cl.⁴ F23B *7/00*

U.S. Cl. 110—349 **8 Claims**



1. A fossil fuel furnace reactor, comprising:

an interior reaction vessel for containing a batch of sample material having a fossile fuel content, said reaction vessel having a wall thickness effective for heat transfer at a prdetermined rate to simulate a process temperature history for a selected continuous processing plant for said fossil fuel;

a heater jacket disposed about said reaction vessel and defining a plurality of independent controllable temperature zones axially spaced along said reaction vessel; and

a pressure vessel insulatingly disposed about said heater jacket and defining a wall thickness effective to contain an

operating pressure functionally selected to simulate said continuous processing plant.

4,706,582

PLANTING DEVICE FOR PLANTS

Aitti K. Keskilohko, Iso-Vimma, Finland, assignor to Lännen Tehtaat Oy, Iso-Vimma, Finland

Filed Jan. 21, 1986, Ser. No. 820,321
Claims priority, application Finland, Feb. 8, 1985, 850549
Int. Cl.[4] A01C *11/00*
U.S. Cl. 111—4 **16 Claims**

1. Planting device for plants, which comprises:
a frame tube open at its top and bottom ends;
a stationary jaw constituting an extension of the bottom end of the tube; and
a pivoting jaw with foot lever, which said pivoting jaw is mounted to one of the bottom portion of the tube and the stationary jaw and the pivoting jaw is in contact with the stationary jaw;
said jaws, when in the closed position, form a wedge-shaped blade and, when in the open position, form an opening larger than the width of a plant ball to be planted;
said device including a catch and discharge device for keeping the pivoting jaw in its open position and for releasing it into its closing position, which said catch and discharge device includes a rod and a spring said spring being connected between the rod and one of the tube and the pivoting jaw with foot lever so as to urge the pivoting jaw into its closing position;
the catch and discharge device further including a trigger lever having branches and being pivotable between a first and second extreme position, said rod interconnecting one of the branches with the pivoting jaw with foot lever such that when the pivoting jaw is in the closed position, the lever is in its first extreme position and, when the pivoting jaw is open, the lever is in its second extreme position;
said spring being in combination with the trigger lever so as to urge the lever into locking engagement in either one of its extreme positions.

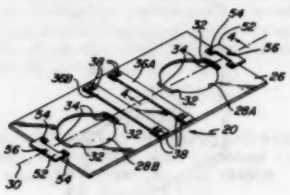
4,706,583

TEMPLATE FOR EMBROIDERY MACHINE

Anthony Darbenzio, R.D. 1, Box 112, Old State Rd., Falls, Pa. 18615

Filed Jul. 29, 1986, Ser. No. 891,448
Int. Cl.[4] D05C *7/04*
U.S. Cl. 112—103 **15 Claims**

1. A template for use with an embroidery machine for embroidering material held within an embroidery hoop, said machine including a working head and a platform located thereunder, said template being arranged for disposition on said platform to hold a pair of embrodiery hoops beside each other so that a first one of said hoops can be located under said working head while the second one of said hoops is located laterally thereof, whereupon said working head can embroidery material held within said first hoop while the second hoop can be unloaded or loaded with said material, said templat including a portion arranged to be engaged to move said template across said platform so that said second hoop can be



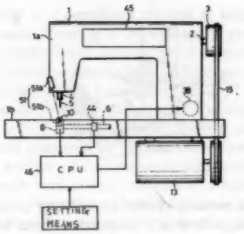
located under said working head, while said first hoop is located laterally thereof, said template comprising a generally planar panel having a pair of aligned openings therein, each of said openings being configured to releasably secure an embroidery hoop with material to be embroidered therein.

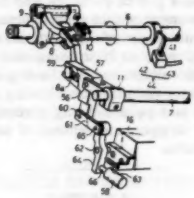
4,706,584

CONTROL UNIT FOR PROVIDING SEAM LENGTH CONTROL OF A SEWING MACHINE

Yutaka Senda, Aichi; Katsuhiko Sato, Nagoya; Tetsuo Kozawa, Toyoake; Etsuzo Nomura, Kasugai, and Yasuo Sakakibara, Hekinan, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Jun. 24, 1986, Ser. No. 877,834
Claims priority, application Japan, Jun. 29, 1985, 60-143623
Int. Cl.[4] D05B *19/00, 27/22*
U.S. Cl. 112—121.11 **17 Claims**





1. In a sewing machine comprising a main shaft; a sewing needle for forming stitches in a work fabric which is placed on a work supporting surface, said needle being movable as a function of the rotation of said main shaft; a feed dog for feeding said work fabric as it passes a sewing point of said sewing needle; a work feed mechanism including a feed bar supported by a feed shaft and carrying said feed dog, said work feed mechanism being adapted to impart motions in a feeding direction to said feed dog by the reciprocating rotation of said

feed shaft as a function of the rotation of said main shaft; and mechanical adjusting means interposed between said work feed mechanism and said main shaft for adjusting a feed pitch of said feed dog by changing the reciprocating stroke of said feed shaft, the improvement comprising:

a control unit for providing seam length control, comprising:

means setting a predetermined seam length;

a signal generator on said work feed mechanism between said feed dog and said feed shaft for generating a signal corresponding to the moving stroke of said feed dog in the feed direction;

means for comparing the signal output from said signal generator with a signal corresponding to said set seam length; and

means for changing the feed pitch of at least a final seam when the compared value reaches a predetermined value.

4,706,585

MAKING BELT LOOPS AND ATTACHING THEM TO ARTICLES OF CLOTHING

Marinus E. Schuurmans, Waalwijk, Netherlands, assignor to USM Corporation, Farmington, Conn.

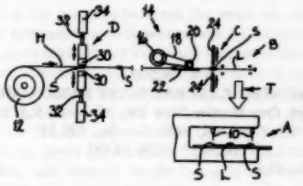
PCT No. PCT/GB85/00502, § 371 Date Jul. 3, 1986, § 102(e) Date Jul. 3, 1986, PCT Pub. No. WO86/02810, PCT Pub. Date May 22, 1986

PCT Filed Nov. 5, 1985, Ser. No. 899,370

Claims priority, application Netherlands, Nov. 5, 1984, 8403360

Int. Cl.[4] D05B *23/00, 3/12, 35/10*

U.S. Cl. 112—121.27 **7 Claims**



1. In an apparatus for making belt loops from a strip of material which apparatus comprises supply means for continuously feeding a strip of material, advancing means for advancing said strip of material step-by-step from said supply to a cutting operation, cutting means for cutting said strip of material into lengths transversely of the direction of advance of the strip material, transfer means for transferring cut lengths of said strip of material to a sewing operation, and sewing means for sewing said strips of material into belt loops;

the improvement which comprise:

an adhesive applicator positioned between said supply means and said advancing means, said applicator comprising two heated nozzles, positioned one on each side of said strip of material, pressing means for pressing said nozzles against the surface of the strip material and control means for operating said nozzles and pressing means such that adhesive is applied on both sides of said stripes of material in transverse stripes, said stripes being spaced apart from one another by a distance corresponding to the length of the belt loop.

4,706,586

AUTOMATIC SEWING MACHINE HAVING A POST-ARRANGED REEL

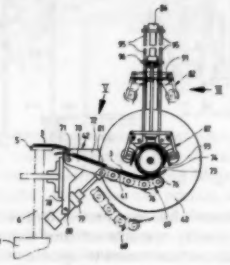
Siegfried Vogt, Lepoldshöne, and Wolfram Schulze, Bielefeld, both of Fed. Rep. of Germany, assignors to Kochs Adler AG, Fed. Rep. of Germany

Filed Feb. 28, 1986, Ser. No. 834,952

Claims priority, application Fed. Rep. of Germany, Mar. 5, 1985, 3507725

Int. Cl.[4] D05B *33/00*

U.S. Cl. 112—121.29 **10 Claims**



1. In an automatic sewing machine for successively sewing workpieces flexibly connected to one another by at least one thread chain, said sewing machine having:

a sewing head;

a reel receiving individual workpieces positioned behind said sewing head, said reel having a core, having a substantially cylindrical curvature;

said reel comprising a lower winder support arranged in front of said reel for feeding and guiding said workpieces connected one to another onto said core of said reel;

an upper winder support which is engageable with said core and which at least partially encases said core at the side opposite to the lower winder support;

said upper winder support being provided with a plurality of rollers, which rollers partially encase said core, and being freely driven by said core;

at least two rollers provided adjacent to one another and not being displaceable to one another;

at least two rollers being supported to two tilt levers, respectively;

the tilt levers being arranged on opposite sides of the at least two rollers not being displaceable to one another;

and the tilt levers being loaded by force storing means in a direction towards said core.

4,706,587

PRESSER FOOT LIFTER IN SEWING MACHINE

Kengo Shiomi, Tokyo, Japan, assignor to Tokyo Juki Industrial Co., Ltd., Tokyo, Japan

PCT No. PCT/JP84/00140, § 371 Date Nov. 19, 1985, § 102(e) Date Nov. 19, 1985, PCT Pub. No. WO85/04430, PCT Pub. Date Oct. 10, 1985

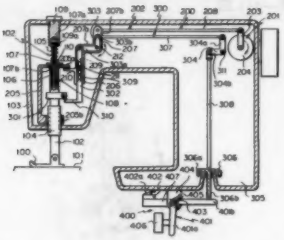
PCT Filed Mar. 28, 1984, Ser. No. 804,637

Int. Cl.[4] D05B *29/00*

U.S. Cl. 112—237 **8 Claims**

1. A sewing machine for use in sewing a workpiece, said sewing machine comprising a pressor foot movable between a lowered position in abutting engagement with the workpiece and a raised position, spring means for pressing said pressor foot against the workpiece when said presser foot is in the lowered position, said spring means being operable between a first condition in which said spring means presses said presser foot against the workpiece with a first spring force when said presser foot is in the lowered position and a second condition

in which said spring means presses said presser foot against the workpiece with a second spring force when said presser foot is in the lowered position, said second spring force being less than said first spring force, operator means for operating said spring means from the first condition in which said spring means presses said presser foot against the workpiece with the first spring force to the second condition in which said spring means presses said presser foot against the workpiece with the



second spring force while said presser foot is in the lowered position, and manually operable actuator means for effecting operation of said operator means to operate said spring means from the first condition to the second condition and for lifting said presser foot from the lowered position to the raised position against the second spring force in response to operation of said actuator means with said presser foot in the lowered position.

4,706,588

FAST-RELEASE SEWING MACHINE CONTROL DEVICE

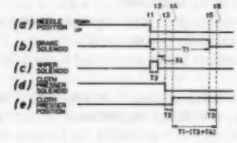
Katsuhiro Fujikawa, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

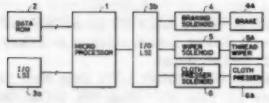
Filed Aug. 18, 1986, Ser. No. 898,164

Claims priority, application Japan, Aug. 22, 1985, 60-184906; Aug. 22, 1985, 60-184907

Int. Cl.[4] D05B *29/02, 69/22*

U.S. Cl. 112—239 **9 Claims**





1. A sewing machine control device comprising:

cloth presser driving means for operating a cloth presser adapted to press a material to be sewn;

brake driving means for operating a brake adapted to stop a vertical movement of a needle; and

control means, operable when said needle is lifted to an upper position thereof at a final stage of a sewing operation for operating said brake driving means for a braking period and for releasing said cloth presser driving means during said braking period wherein the sewn material may be removed from the machine before said braking period is ended.

4,706,589

NEEDLE THREAD GUIDING APPARATUS

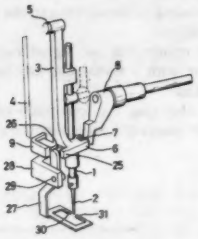
Takashi Tsukioka, Chofu, Japan, assignor to Tokyo Juki Industrial Co., Ltd., Chofu, Japan

Filed Feb. 26, 1987, Ser. No. 19,236

Claims priority, application Japan, Feb. 28, 1986, 61-28923[U]

Int. Cl.[4] B65H *57/00*

U.S. Cl. 112—302 **5 Claims**



1. An apparatus for guiding a needle thread extending between the eye of the needle and the work being sewn when the needle is above the work, comprising:

a needle bar for vertically displacing a needle connected to one end of said needle bar;

means for laterally displacing or oscillating said needle bar and needle;

a guide plate for guiding said needle thread;

means for oscillating said guide plate in a direction opposite to said needle's oscillating direction during the vertical displacement of said needle thereby guiding said needle thread away from said needle.

4,706,590

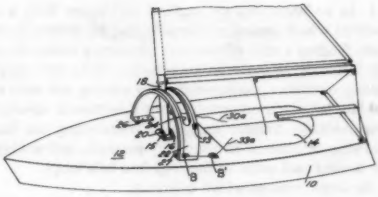
DECK MOUNTED LATERAL MAST RAKE ADJUSTER

John G. Hoyt, One Harbor View Dr., Newport, R.I. 02840

Filed Oct. 29, 1986, Ser. No. 924,332

Int. Cl.[4] B63B *15/00*

U.S. Cl. 114—39.1 **5 Claims**



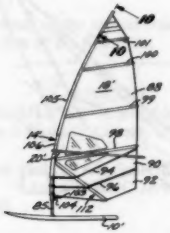
1. A sailing vessel having a hull, means to establish directional control of the hull, a mast, means pivotally connecting the mast to the hull at the lower end thereof, a sail detachably secured to the mast, a unitary athwartships structure spaced substantially above the lower end of the pivotal mast for the sole support of the mast both fore and aft and athwartships and means connected to the mast for altering the angle of the mast relative to the hull.

4,706,591

SAIL SYSTEM WITH ADJUSTABLE SAIL AREA

Randall H. Reynolds, 506 35th St., Newport Beach, Calif. 92663

Continuation-in-part of Ser. No. 561,040, Dec. 13, 1983, Pat. No. 4,612,868. This application Jun. 26, 1986, Ser. No. 878,668
The portion of the term of this patent subsequent to Sep. 23, 2003, has been disclaimed.
Int. Cl.[4] B63H 9/04
U.S. Cl. 114—103 10 Claims



1. A sail system for a wind-driven craft having a mast and a boom, said sail system comprising:

an upper sail section having a luff securable adjacent the mast, a leech extended distally from the mast, a foot at the bottom thereof extending between said luff and said leech, a tack at the juncture between said luff and said foot and a clew at the juncture between said leech and said foot;

a lower sail section having a luff securable adjacent the mast, a leech extended distally from the mast, a foot at the bottom thereof extending between the luff and the leech, a tack at the juncture between the luff and the foot, and a clew at the juncture between the leech and the foot;

readily removable attachment means to continuously seam the upper edge of said lower sail section to the lower edge of said upper sail section from said tacks to said clews;

means for adjusting the effective height of the mast between a first extended height when the lower sail section is attached to the upper sail section and a second height when the lower sail section is removed from the upper sail section, said second height being lower than said first height by an amount approximately equal to the length of the luff edge of said lower sail section;

the free end of the boom being secured to the clew of the lower sail section when the lower sail section is attached to the upper sail section and with the free end of the boom being secured to the clew of the upper sail section when the lower sail section is removed from the upper sail section, and also with the tack of the lower sail section being downhauled adjacent the lower portion of the mast when the lower sail section is attached to the upper sail section and the tack of the upper sail section being downhauled to the lower portion of the mast when the lower sail section is removed from the upper sail section;

first batten pocket means formed on the upper sail section;

second batten pocket means formed on the lower sail section in alignment with said first batten pocket means;

first batten means insertable in said first batten pocket means;

second batten means, the lower end of said first batten means being removably engageable with the upper end of said second batten means; and

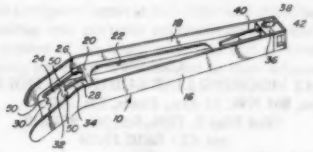
retainer means on said sail sections to removably secure the batten means within their respective batten pockets.

4,706,592

STEERING ARM FOR OUTBOARD MOTORS

B. Kenneth Walthall, Arlington, Tex., assignor to Molded Parts Specialists, Arlington, Tex.

Filed Sep. 5, 1986, Ser. No. 903,783
Int. Cl.[4] B63H 25/00
U.S. Cl. 114—153 5 Claims



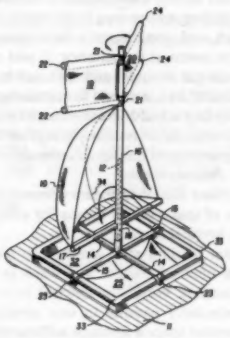
1. A steering arm for outboard motors comprising an elongate arm body member having a pair of vertical side web portions extending substantially the full length of said body member and a central horizontal web portion, said body member having a clamping means at one end thereof and including an integrally formed boss having a semi-circular cutout formed in the free end thereof, a clamp member having a semi-circular cutout complementary to the cut-out in said body member so that said cut-outs substantially surround a motor support shaft and clamp the motor support shaft therebetween, means for securing said clamp member to said body member, said vertical side web portions being angled downwardly in their vertical planes at said other end, and means defining openings and reinforcing ribs in said central horizontal web portion adjacent the downwardly angled ends thereof, and a vertical reinforcing web connecting said boss and said central horizontal web.

4,706,593

SWIVELING WIND SCOOP

Philip G. Vail, Jr., 806 Monticello Ct., Cape Coral, Fla. 33904

Filed Mar. 28, 1985, Ser. No. 717,100
Int. Cl.[4] B63B 19/06
U.S. Cl. 114—211 10 Claims



1. A wind scoop for ventilating the enclosed interior area of a boat through a generally horizontally disposed hatch opening thereof, comprising:

flexible sail means made of a cloth-like material and being oriented for continuously directing an air flow into said hatch opening independent of the direction of said boat with respect to the wind, the orientation of said flexible sail means being responsive to the direction of the wind;

mast means for rotatably supporting said sail means above said hatch opening;

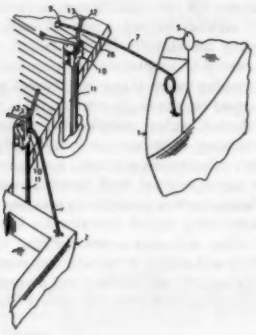
and means for fastening said mast means to said boat above said hatch opening.

4,706,594

BOAT MOORING LINE GUIDE AND HOLDER

Joel Burns, 801 NW. 12 Ave., Dania, Fla. 33004

Filed May 2, 1986, Ser. No. 859,020
Int. Cl.[4] B63B *21/04*
U.S. Cl. 114—230 20 Claims



14. A mooring line guiding and holding system for securing a watercraft to a fixed vertical surface such as a piling or seawall with a throw line terminating in an enlarged head, comprising:

(a) head engaging and retaining vertical channel means, said channel means having a substantially vertical longitudinal axis and including an opening at its upper end for receiving said head, and vertical walls for retaining said head;

(b) vertical slot means at the anterior of said channel means with an opening at its upper end for receiving said line and with a closure at its lower end for retaining said line, said slot means having a width great enough to freely pass said line and too narrow to permit passage of said head, said slot means providing a passage coextensive with the space within said channel means;

(c) vertical surface attaching means connected to the posterior portion of said channel means for attaching said system to said vertical surface;

(d) a pair of line guiding arms attached to the anterior portion of said channel means, said arms in a first, lower portion extending vertically upward from said channel means substantially parallel to one another and spaced apart in a central space a distance sufficiently great to pass said line but insufficient to pass said head, said arms in a second, upper portion extending upward from said lower portion at an angle from the vertical of greater than ten degrees and less than eighty degrees, wherein the pair of upper portions of arms form a V-shape lying substantially in a plane intersecting the path of a line thrown from said water craft to said fixed object,

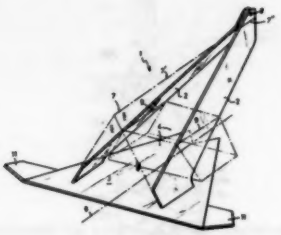
said arms adapted for guiding said line down from any lateral position at which it strikes said arms and centrally to said central space as it falls and for guiding said head at the end of said line into the top of said channel means.

4,706,595

ANCHOR

Rob van den Haak, Allegro 114, 2925 BG Krimpen a/d Ijssel, Netherlands

Continuation of Ser. No. 645,518, Aug. 28, 1984, abandoned, which is a continuation of Ser. No. 304,506, Sep. 22, 1981, abandoned. This application Apr. 22, 1985, Ser. No. 725,381
Claims priority, application Netherlands, Sep. 25, 1980, 80 05341
Int. Cl.[4] B63B *21/26*
U.S. Cl. 114—301 1 Claim



1. An anchor comprising a fluke and a shank attached to the fluke, said fluke having front and rear portions, said fluke having a longitudinal axis going through a central part of the fluke in the front to rear direction,

said shank having two legs being positioned to each other at an angle to define a V-shaped body, each said leg of the shank having substantially flat configuration, said legs lying in planes intersecting each other along a first line of intersection positioned at a top portion of the shank, said first line of intersection meeting the longitudinal axis of the fluke at a point lying forwardly of the fluke;

stabilizing means in the form of plate arrangements, at least one entire side of each said plate arrangement being contiguously attached at side edges of the rear portion of the fluke, said each plate arrangement being positioned to a top surface of the fluke at an angle not exceeding 180°; one entire first side of each said leg of the shank connecting the shank with the top surface of the fluke being contiguous with the top surface of the fluke;

an angle between the direction of said first side of each said leg and the longitudinal axis of the fluke is betwee 0°-9°;

a tunnel passage having a substantially constant cross-sectional area being defined between the shank legs and the fluke, said area being designed for glided penetration and displacement of a soil therethrough.

4,706,596

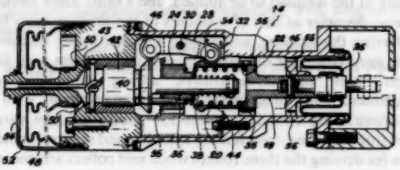
ACTUATOR USABLE IN A FLUID UNDER HIGH PRESSURE

Philippe Charvin, Massy, and Paul Vavasseur, Boullay les Trouxllimars, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Dec. 19, 1985, Ser. No. 811,005
Claims priority, application France, Jan. 3, 1985, 85 00038
Int. Cl.[4] B63G *8/00*
U.S. Cl. 114—312 19 Claims

1. An actuator usable in a fluid under a high pressure, called the first fluid, of the type having a plunger which is mobile with respect to a structure and connected thereby by a spring, as well as means for locking the plunger with respect to said structure wherein at least part of the plunger, the spring and

the locking means are located within a closed frame containing a second fluid and wherein the actuator has enabling means



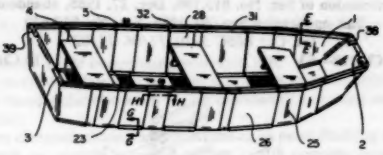
enabling the pressure of the second fluid in the frame to constantly adapt to that of the first fluid.

4,706,597

SEAMLESS FOLDABLE BOAT

Frank M. Figone, 2 Peabody Terrace, #701, Cambridge, Mass. 02138

Filed Jan. 6, 1986, Ser. No. 816,224
Int. Cl.[4] B24C *24/00*
U.S. Cl. 114—353 **21 Claims**



1. A compact foldable boat comprising:

a single piece hull having two opposing sides, a bottom and bow and stern section;

membrane tension members connected to the sides and the bottom of said hull at the bow and stern for preventing the sides of said hull from folding out when said boat is assembled;

said opposing sides including side membrane members integral to and between side panels and connected to the bottom to allow transverse folding of the boat the bottom of said boat including bottom panels and intrinsically hinged bottom panels between said bottom panels;

a side-to-bottom hinge member connected to each of the side panels and bottom panels of the boat for providing resistance to folding and bending of said boat when said boat is assembled; and

intrinsically hinged bottom panels connected between the bottom panels and to said side membrane members for providing bending stiffness to said boat when said boat is assembled.

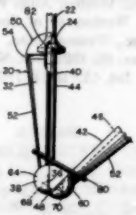
4,706,598

DETACHABLE HANDLE EXTENDER AND TRANSVERSE ENLARGER FOR USE WITH LONGITUDINALLY RECIPROCABLE HANDLES OR PLUNGERS BY HANDICAPPED PERSONS

William L. Jeffress, 740 Elm, Emporia, Kans. 66801

Filed May 1, 1986, Ser. No. 858,106
Int. Cl.[4] B25G *3/12*
U.S. Cl. 16—112 **1 Claim**

1. An improved handle for enabling persons having hands that have been dismembered or that are affected by arthritis and the like to handle devices that must be longitudinally reciprocated, said improved handle comprising an elongated body that includes a transversely extending grasping portion at one end that is adapted to be grasped by a crippled hand, with said body also including a device engaging portion at its other end that is adapted for engagement with an end of a longitudinally reciprocable device that is to be handled, said body being comprised of two sections each of which extend the length of the body, means connecting the sections together at said one end of the body for swinging movement of the sections toward and away from each other about an axis that is normal to the longitudinal extent of the body between a closed position such that adjacent faces of the sections seat against each other and an open position wherein the adjacent faces of the sections diverge and are spaced apart at said other end of the body, said sections having end portions corresponding to said device engaging portion of the body, with said end portions of the sections being provided with recesses in their adjacent faces



adapted to receive in mating fashion and to engage a device therebetween when the sections are swung to their closed position, means outside the body for releasably retaining the sections in their closed position, said body having a transverse peripheral extent that increases monotonically from the grasping portion to the device engaging portion, said means for releasably retaining the sections closed comprising a resilient band encircling the body intermediate the grasping and device engaging portions, said device engaging portion of the body having a peripheral retention groove thereabout adapted to tautly receive the resilient band therein, with said device engaging portion having a recess therein that communicates with said retention groove, thereby to facilitate dislodgment of the band from the retention groove.

4,706,599

BOAT COCKPIT ENCLOSURE

David E. Johnson, Venice, Fla., assignor to John R. Paris, Venice, Fla.

Continuation of Ser. No. 850,721, Apr. 11, 1986, abandoned, which is a continuation of Ser. No. 666,998, Oct. 31, 1984, abandoned, which is a continuation-in-part of Ser. No. 427,867, Sep. 29, 1982, Pat. No. 4,492,175, which is a continuation-in-part of Ser. No. 389,712, Jun. 18, 1982, abandoned. This application Feb. 26, 1987, Ser. No. 21,518
Int. Cl.[4] B63H *9/00*
U.S. Cl. 114—361 **12 Claims**

1. In a watercraft having an open area and an elevated covering disposed over said open area, the combination of said elevated covering and a free hanging flexible enclosure having

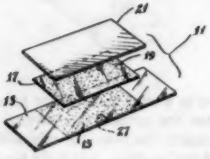
an upper edge removably secured to said covering by manually operable fasteners, said flexible enclosure being draped downward from said elevated covering and having a lower edge formed as a gusset-like hem wrapped around a weighting member, said flexible enclosure being so dimensioned in height and said weighting member being of such weight that said weighting member holds said free hanging enclosure relatively taut and so that said gusset-like hem at the lower edge of said enclosure engages a surface of said watercraft wherein said weighting member comprises a rope.

4,706,600

KIT FOR MAKING SETS OF TRANSPARENT FINGERPRINTS USING DIFFERENTIAL ADHESION

Stanley I. Mason, Jr., Weston; Allan P. Wolfe, Redding, and Robert B. Turner, Weston, all of Conn., assignors to Crisis Communication, Inc., Weston, Conn.

Filed Nov. 10, 1986, Ser. No. 928,966
Int. Cl.[4] B41K *1/00*
U.S. Cl. 118—31.5 **7 Claims**



5. A kit for making permanently sealed transparent fingerprints using differential adhesion, said kit including

a backing sheet and a transparent adhesive print strip,

a transparent record sheet,

backing adhesive adhering together said backing sheet and said adhesive print strip, and

said adhesives having such differential adhesion as to cause greater adhesion between said adhesive print strip and said record sheet than between said adhesive print strip and said backing sheet,

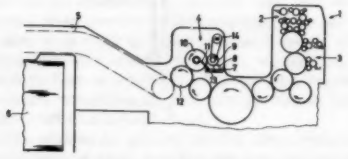
whereby dry ink fingerprints can be applied to said adhesive print strip and said adhesive print strip can be adhered to said record sheet to sandwich said fingerprint between said adhesive print strip and said record sheet.

4,706,601

DEVICE FOR APPLYING MEDIUM AFTER TERMINATION OF THE PRINTING OPERATION IN A PRINTING MACHINE

Hans-Georg Jahn, Wiesenbach, Fed. Rep. of Germany, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 626,732, Jul. 2, 1984, abandoned. This application May 20, 1985, Ser. No. 735,954
Claims priority, application Fed. Rep. of Germany, Jul. 5, 1983, 3324096
Int. Cl.[4] B05C *1/02, 11/10*
U.S. Cl. 118—46 **6 Claims**



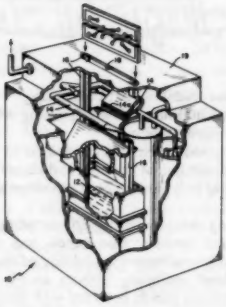
1. In a printing machine, a medium applicator disposed downstream of printing units of the machine in the travel direction of a sheet which has been printed, the applicator having three rollers including a first roller for taking up medium from a supply container, a second roller for metering a quantity of the medium to be applied, and a third roller having the same diameter as that of cylinders of the printing units for transferring the medium, comprising a rubber lining disposed on the third roller for directly applying the medium onto the printed sheet; the three rollers, during application of the medium, being in constant meshing engagement with a sheet-transferring cylinder; means for uncoupling the three rollers from the sheet-transferring cylinder, and separate motor means for driving the three rollers when said rollers are uncoupled.

4,706,602

SOLDER COATER BOARD CLAMP

Richard Polacek, Santa Barbara, Calif., assignor to Gyrex Corporation, Santa Barbara, Calif.

Continuation of Ser. No. 813,796, Dec. 27, 1985, abandoned. This application Sep. 30, 1986, Ser. No. 913,620
Int. Cl.[4] B05C *3/10, 11/06, 13/02*
U.S. Cl. 118—63 **14 Claims**



1. A clamp for dipping a printed circuit board (PCB) into a solder bath, comprising:

(a) a first plate;

(b) series of first clamping fingers fixed to the first plate laterally spaced and coplanar with each other;

(c) a movable second plate;

(d) means for mounting the first plate to the second plate in spaced, substantially parallel relationship to each other, said mounting means including spring means for biasing the second plate from the first plate;

(e) a series of second clamping fingers fixed to the second plate to extend respectively between and coplanar with the first clamping fingers; and

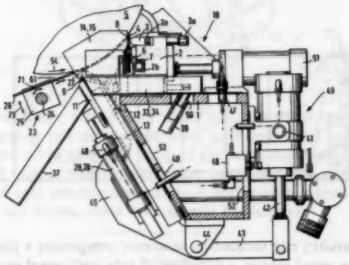
(f) means for pivotally securing the first clamping fingers to the second clamping fingers, movement of the second plate in a direction perpendicular to the plane of the first plate under the influence of an applied actuating force causing the second fingers to pivot out of the plane of the first fingers enabling insertion of the PCB between the first and second fingers, whereby removal of the actuating force allowing the second plate to move under spring bias causes the second fingers to pivot towards the first fingers and thereby clamp the PCB therebetween.

4,706,603

COATING APPARATUS WITH EDGE PROTECTION FOR PAPER WEBS

Gerhard Wohlfeil, Monheim, Fed. Rep. of Germany, assignor to Jagenberg Aktiengeselischaft, Dusseldorf, Fed. Rep. of Germany

Filed Apr. 2, 1986, Ser. No. 847,432
Claims priority, application Fed. Rep. of Germany, Apr. 12, 1985, 3513063
Int. Cl.[4] B05C *5/02*
U.S. Cl. 118—410 12 Claims



1. An apparatus for coating a web carried along a roll, comprising:

a doctor blade cooperating with said roll;

an overflow plate spaced from said blade so as to define a chamber therebetween for accomodating a coating material;

dam elements closing said chamber at its sides flanking said roll and tightly arranged against axially opposite ends of said overflow plate and said roll; and

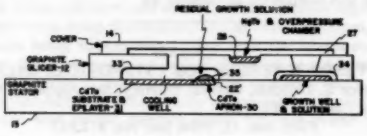
adjustable edge blade means for preventing a coating of the web along its edges, said edge blade means being positioned along said edges adjacent said dam elements.

4,706,604

WIPE-OFF APPARATUS OF LIQUID PHASE EPITAXY OF MERCURY CADMIUM TELLURIDE

Robert J. Hager, Minneapolis, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jun. 9, 1986, Ser. No. 872,321
Int. Cl.[4] H01L *21/208*
U.S. Cl. 118—415 1 Claim



1. Apparatus for improved wipe-off of residual LPE growth solution from a newly grown epitaxial layer of HgCdTe in a slider furnace boat apparatus, comprising:

a slider type graphite boat for use in a liquid phase epitaxy growth furnace, which boat includes a base member and a slider member;

an elongated recess in said base member sized to receive in tandem a CdTe substrate and a CdTe apron which apron has a scribed surface;

a CdTe substrate and a discardable CdTe apron in tandem in said recess, said CdTe apron having a plurality of diagonal scribe marks on its scribed surface;

said slider member having a planar lower face adapted to mate with and be slideable along said base member top face, said slider member having a first growth well extending therethrough from a top surface to the lower face for receiving and holding a growth solution of $(Hg_{1-x}Cd_x)_{1-y}Te_y$, said first well being slideable over said recess for epitaxial growth on said substrate and scribed apron,

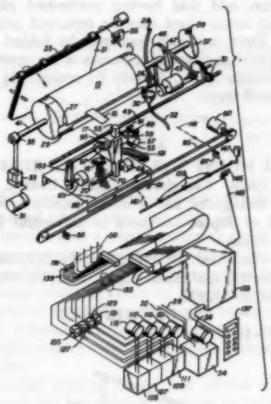
said slider member also having a cooling well extending therethrough from the top surface to the lower face and positioned in said slider member so that as the slider member is moved along the base to remove the growth well and growth solution first from the substrate and next from the scribed apron, the cooling well then comes into position over said recess, and any remnant solution attempting to migrate back towards the substrate with its newly grown epilayer is contained by the scribed apron.

4,706,605

SELF-CLEANING ELECTROSTATIC COLOR PRINTER

Andreas Bibl, Los Altos; Gene F. Day, Cupertino, and Higginson, John A., Santa Clara, all of Calif., assignors to Precision Image Corporation, Redwood City, Calif.

Continuation-in-part of Ser. No. 796,872, Nov. 12, 1985, Pat. No. 4,655,165, which is a continuation-in-part of Ser. No. 763,040, Aug. 6, 1985. This application May 9, 1986, Ser. No. 861,522
Int. Cl.[4] B05B *5/00*
U.S. Cl. 118—631 14 Claims



1. An electrostatic color printer comprising,

drum means rotating about an axis for supporting a sheet bearing an electrostatic latent image color overlay pattern,

means conforming to a portion of said sheet on said drum means for applying color fluid developer to said latent image color overlay pattern in a helical scan pattern of plural abutting stripes, said means having a width corresponding to said stripes and being in selective and sequential communication with a plurality of supplies of color fluid developers to form a composite color image on said sheet in a plurality of helical scans, said developers sharing a small common volume, and

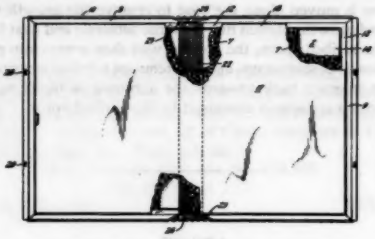
means adjacent to an end of said drum means for rinsing said means for applying fluid developer with a developer solvent after each helical scan.

4,706,606

HYGIENIC ASSEMBLY FOR USE BY CATS

Claude Coppola, Columbia Palace, 11 Avenue de Princesse Grace, Monte Carlo, Monaco 98000

Filed Oct. 29, 1986, Ser. No. 924,568
Claims priority, application France, Nov. 6, 1985, 85 16290
Int. Cl.[4] A01K 1/01
U.S. Cl. 119—1 4 Claims



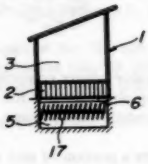
1. An improved disposable litter tray for use by pets comprising: a planar bottom wall and a plurality of contiguous side and end walls interconnected to said bottom wall in mutually converging configuration, said side and end walls each forming a continuous horizontally oriented medially positioned shoulder; a flexible cover sheet of dimensions corresponding to that of said shoulder secured at peripheral edges thereof to said shoulder in sealed relation; and a quantity of litter disposed within said tray upon said bottom wall and beneath said cover sheet; said bottom wall having a transversely extending preformed fold therein, the area on each of a pair of opposed side walls adjacent said fold having preformed pleats therein, whereby said cover sheet may be removed prior to use to expose said litter, and said tray may be folded transversely after the use to abut opposed segments of the upper continuous edge of said side and end walls to completely enclose the contents of said tray.

4,706,607

STALL HOUSE FOR LIVESTOCK BREEDING

Masakatsu Ijichi, Kagoshima; Yutaka Uehara, Fukushima; Masahiro Sakaguchi, and Shinichi Imamura, both of Kagoshima, all of Japan, assignors to Kabushiki Kaisha Ijichi Shukeijo, Japan

Filed Mar. 19, 1985, Ser. No. 713,708
Claims priority, application Japan, Mar. 19, 1984, 59-53059; Jun. 18, 1984, 59-123615
Int. Cl.[4] A01K 31/00
U.S. Cl. 119—16 2 Claims



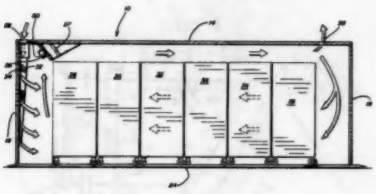
1. A stall house for livestock breeding which comprises:
(a) a plural number of pens assembled in an array to form a house and partitioned with fences each from the adjacent pens;
(b) slatted boards forming the floor of the pens installed in a demountable fashion;
(c) an excrement-receiving vessel under the floor of the pens extending from under the pen at one end of the array of pens to under the pen at the other end thereof and containing a bed of sawdust; and
(d) a travelling shuffler for shuffling the sawdust bed in the excrement-receiving vessel and capable of running from one end to the other of the array of pens over the sawdust bed contained in the excrement-receiving vessel.

4,706,608

INCUBATION STRUCTURE

Matthew R. Foster, Cambridge, Canada, assignor to The Marmon Group, Inc., Chicago, Ill.

Filed Jan. 22, 1986, Ser. No. 821,360
Int. Cl.[4] A01K 41/00
U.S. Cl. 119—35 32 Claims



7. A poultry egg incubation structure comprising a plurality of ceiling panel means, a plurality of side wall panel means, a front end panel means including at least one door, a rear end panel means including at least one door, joining means for interconnecting said ceiling panel means, side wall panel means and end panel means to form an incubation chamber, an air intake vent disposed in at least one of said ceiling panel means adjacent said front end panel means for permitting the flow of cool air to extend into said incubation chamber, an air exhaust vent disposed in at least one of said ceiling panel means adjacent said rear end panel means for permitting the exiting of air from within said chamber, environmental control means attachd to at least one of said ceiling panel means wear near said front end panel means for humidifying, heating and circulating air within said chamber, and an intake air flow control means including at least a vertically disposed front wall attached to said ceiling in communicating alignment with said air intake vent for receiving cool external air and introducing said cool external air into said chamber, said intake air flow control means being spaced from said front end panel means and having at least one substantially open side for controlling the mixing of cool external air with heated and humidified internal air by forcing the cool air to gradually disperse from said intake air flow control means initially in a direction away from the eggs in the incubation structure under the influence of said heated and humidified circulating air.

4,706,609

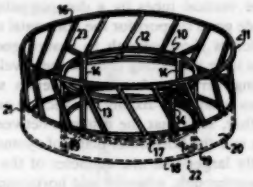
LIVESTOCK FEEDER FOR CYLINDRICAL BALES

Lawrence G. Delichte, General Delivery, Ste. Alphonse, Manitoba, Canada R0K 1Z0

Filed Jun. 11, 1986, Ser. No. 872,917
Int. Cl.[4] A01K 5/00
U.S. Cl. 119—60 8 Claims

1. A feeder for receiving a large cylindrical bale for distributing the bale to a group of animals all of which are of substantially the same size, the feeder comprising an inner frame structure arranged and dimensioned to surround the bale and to act as a confining structure therefor, an outer frame structure surrounding the inner frame structure including a plurality of spaced bars arranged and dimensioned such that the bars prevent the body of the animal from passing through the outer frame structure to the inner frame structure while allowing the head and neck to pass therethrough, and means interconnecting the outer frame structure and the inner frame structure arranged to support the inner frame structure in spaced position from the ground and to maintain the spacing between the

outer frame structure and the inner frame structure such that the head of the animal can be received therebetween and such that the animal, with its body maintained exteriorly of the outer frame structure by said bars, can reach the bale inside the inner frame structure for feeding therefrom, wherein said outer



frame structure includes an upper rail, a bottom rail and an intermediate rail member between said upper and lower rail members, all of said rails being of the same shape and lying in parallel planes, said bars being arranged between said upper rail and said intermediate rail and skirt means extending between said intermediate rail and said bottom rail.

4,706,610

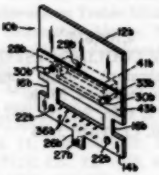
LIVESTOCK DATA INDICATOR

Charles Morgan, Jr., P.O. Box 837, College Grove, Tenn. 37046

Continuation-in-part of Ser. No. 661,139, Oct. 15, 1984, Pat. No. 4,574,742. This application Jan. 31, 1986, Ser. No. 824,461

Int. Cl.[4] G09F *3/00*

U.S. Cl. 119—156 **3 Claims**



1. A livestock data indicator comprising two plastic members joined by at least two plastic hinges located adjacent the edges of the members and adapted to be folded and fastened together, one of said members having at least two studs thereon and the other having at least two holes into which said studs fit when said members are folded and fastened together, with said studs being substantially in line with the hinges, and said holes being substantially in line with the hinges on the member that does not have said in-line studs, a substantially centrally positioned stud on one of said members, and a centrally positioned hole substantially in-line with said centrally positioned stud on the member which has said in-line studs thereon.

4,706,611

METHODS AND APPARATUS FOR PRODUCING STEAM WITHOUT A BOILER

Bill W. Nelson, P.O. Box 872969, Wasilla, Ak. 99687

Filed Aug. 8, 1986, Ser. No. 894,920

Int. Cl.[4] F22B *37/00*

U.S. Cl. 122—5.5 A **22 Claims**

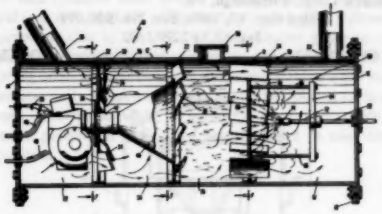
1. An apparatus for producing steam, comprising:

a vessel defining a longitudinal axis and opposing front and rear longitudinal ends, an inlet disposed adjacent said front end and an outlet disposed adjacent said rear end,

means for introducing compressed air into said inlet such that the air travels from said inlet toward said outlet,

means for inducing a continuous swirling motion of the air about said longitudinal axis as it travels,

heating means for heating the air,



sprayer means for spraying water into said swirling heated air such that the water becomes vaporized and entrained in the air flow and exits as steam through said outlet.

4,706,612

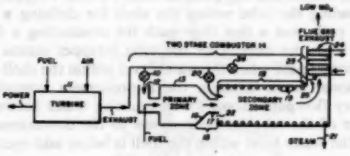
TURBINE EXHAUST FED LOW NO_x STAGED COMBUSTOR FOR TEOR POWER AND STEAM GENERATION WITH TURBINE EXHAUST BYPASS TO THE CONVECTION STAGE

Frederick E. Moreno, Los Altos, and Creighton D. Hartman, San Francisco, both of Calif., assignors to PruTech II, San Jose, Calif.

Filed Feb. 24, 1987, Ser. No. 17,484

Int. Cl.[4] F22D *1/00*

U.S. Cl. 122—7 R **3 Claims**



1. In a low NO_x method for generating power and steam for thermally enhanced oil recovery, the steps of:

firing a gas turbine with a nitrogen-bearing crude oil and air to produce power and hot turbine exhaust gas;

feeding a first portion of the hot turbine exhaust gas together with a nitrogen-bearing crude oil into a primary combustion chamber of a staged combustor for burning the crude oil under fuel-rich conditions to produce hot exhaust gaseous combustion products exiting the primary combustion chamber;

feeding a second portion of the hot turbine exhaust gas together with the hot exhaust gases of the primary combustion chamber into a second combustion chamber lined with water-filled boiler tubes to complete the combustion of the crude oil fed into the primary combustion chamber and to produce steam in said boiler tubes and to produce a stream of hot exhaust gas exiting said second combustion chamber;

feeding a third portion of the hot turbine exhaust gas together with the hot exhaust gas exiting said second combustion chamber into a convection chamber containing finned water-filled boiler pipes for transfer of heat from the turbine exhaust and the exhaust of said second combustion chamber to the water in said boiler pipes to generate steam in said finned boiler pipes; and

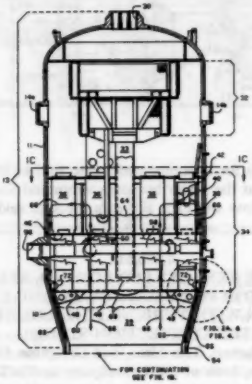
varying the flow rate of the first portion of the turbine exhaust inversely with the flow rate of the third portion of the exhaust to vary the rate of steam generation, whereby steam is efficiently generated over a wider range of steam generation rates.

4,706,613

STEAM GENERATOR HAVING AN AUXILIARY RECIRCULATION PATH

Allen C. Smith, Jr., Bethel Park, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 17, 1986, Ser. No. 920,091
Int. Cl.[4] F22B *1/02*
U.S. Cl. 122—32 30 Claims



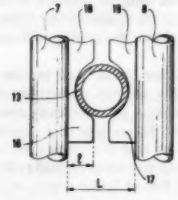
1. An improved steam generator of the type having a shell that contains a quantity of water, at least one heat exchanger tube for converting the water to steam, a tube wrapper means surrounding the tube within the shell for defining a downcomer path, and a first flow path for conducting a flow of water from the interior of the tube wrapper means to the downcomer path when the water level within the shell is at an operational level, wherein the improvement comprises an auxiliary flowpath means for conducting water between the interior of the tube wrapper means to the downcomer path when the water level within the shell is below said operational level.

4,706,614

DEVICE FOR SUSPENDING A BUNDLE OF HORIZONTAL TUBES IN A VERTICAL PLANE AND METHOD OF FABRICATING THE DEVICE

Jean Fournier, and Henri Patron, both of Rochefort en Yvelines, France, assignors to Stein Industrie, Velizy-Villacoublay, France

Continuation of Ser. No. 673,241, Nov. 19, 1984, abandoned.
This application Apr. 2, 1986, Ser. No. 847,139
Claims priority, application France, Nov. 25, 1983, 83 18814
Int. Cl.[4] F22B *37/24*
U.S. Cl. 122—510 2 Claims



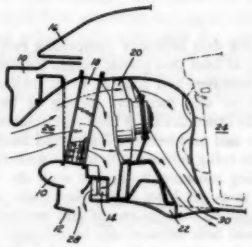
1. A device for suspending a bundle of horizontal tubes in a vertical plane, said device comprising pairs of vertical tubes provided with half-fins on their facing sides, said half-fins being welded at weld zones along one edge, respectively, to said pairs of vertical tubes, the improvement, wherein said half-fins have a profile including notches of circular shape, having a radius slightly larger than the radius of the horizontal tubes of the bundle and being at the same spacing as said horizontal tubes, the notches being separated by tongues which project from the vertical tubes by a distance which is long enough to provide good support for the horizontal tubes of the bundle and which is short enough to ensure good thermal conduction from their projecting ends to their weld zones on the corresponding vertical tubes, and wherein said device further comprises means for fixably connecting said vertical tubes to each other, such that the distance between opposed circular notches and the horizontal plane of symmetry of the notches is slightly larger than the diameter of the horizontal tubes passing therethrough, whereby said horizontal tubes rest on the bottoms of said circular notches of the facing half-fins for effective heat transfer therebetween with the axes of the tubes being slightly below the horizontal plane of symmetry of the notches and the assembly of horizontal tubes being free of stresses due to thermal expansion and vibration, and wherein adjacent vertical tubes include spaced, oppositely directed lateral kinks which bring the tubes towards each other and horizontal spacers having ends welded to kinks of respective vertical tubes.

4,706,615

ENGINE COOLING SYSTEM

John R. Scadding, Chelmsford, United Kingdom, assignor to Ford Motor Company, Dearborn, Mich.

Filed Jul. 2, 1986, Ser. No. 881,538
Int. Cl.[4] F01P *5/06*
U.S. Cl. 123—41.01 3 Claims



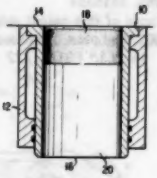
1. A motor vehicle engine cooling system, comprising a radiator (18) totally enclosed within ducting such that air flowing through the radiator (18) does not otherwise pass through the engine (24) compartment, and further passages for allowing ambient air to enter and leave the engine compartment, characterised in that the ducting of the radiator (18) has a forward facing inlet (26) upstream of the radiator (18) which opens at the front of the vehicle, a first outlet (28) facing forwards and disposed adjacent a speed spoiler (12) at the front of the vehicle and connected to the radiator by a branch of the ducting containing a non-return valve (14) and a second outlet (30) disposed on the underside of the vehicle and connected to the radiator (18) by a branch of the ducting containing a power driven fan (20).

4,706,616

INTERNAL COMBUSTION ENGINE CYLINDER LINER COATINGS

Toshio Yoshimitsu, Oyama, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Jun. 23, 1986, Ser. No. 877,651
Int. Cl.[4] F02F 1/16
U.S. Cl. 123—41.84 3 Claims



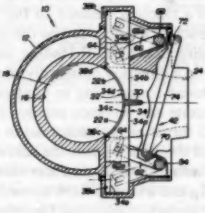
1. In an internal combustion engine having a cylinder liner mounted in a cylinder block, the improvement comprising a a first coating of a wear and seizure resistant material applied to the inside surface of a prescribed upper portion of the cylinder liner, and a second coating of a surface treating agent composed principally of manganous phosphate applied to the remaining inside surface of the cylinder liner, the first coating being more wear and seizure resistant than the second coating at higher temperatures to which the upper portion of the cylinder liner is subjected during engine operation than is the other portion.

4,706,617

TWO-CYCLE ENGINE

Masahiro Asai, Tokorozawa; Toshio Mizushima, Wako; Toshiro Kawai, Asaka; Shigemitsu Akutsu, Nerima, and Yoshiaki Uozumi, Wako, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Japan

Filed Aug. 27, 1985, Ser. No. 770,056
Claims priority, application Japan, Aug. 28, 1984, 59-178873; Dec. 29, 1984, 59-276554; Dec. 29, 1984, 59-276555; Jan. 11, 1985, 60-2787; Jan. 11, 1985, 60-2788; Jan. 12, 1985, 60-3720; Jan. 12, 1985, 60-3721; Jan. 12, 1985, 60-3722; Jan. 30, 1985, 60-16271; Jan. 30, 1985, 60-16272; Apr. 19, 1985, 60-83820
Int. Cl.[4] F02B 75/02
U.S. Cl. 123—65 PE 20 Claims



1. A two-cycle engine comprising:

(a) a cylinder block having a cylinder head thereon, said cylinder block having a cylinder and an exhaust port formed in a side wall of said cylinder, and said cylinder block having an exhaust passage communicating with said exhaust port wherein a main flow of exhaust gases is expelled from said cylinder through said exhaust port and in a direction along the exhaust passage;

(b) a piston received in said cylinder for reciprocal movement therealong; and

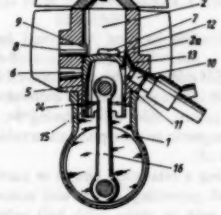
(c) a port timing control means comprising a port timing control valve which is mounted on said cylinder block and has a timing control surface, said control valve being movable in a plane substantially perpendicular to the axis of said cylinder between a closed position wherein said valve is disposed in said exhaust passage with said control surface closing the end portion of said exhaust port closer to said cylinder head and an open position wherein said valve is retracted out of said exhaust passage in a direction perpendicular to the flow of said exhaust gases to open said end portion of said exhaust port, said control surface being of an arcuate concave shape and having a curvature substantially equal to that of an inner peripheral surface of said cylinder so as to be smoothly continuous with the inner peripheral surface of said cylinder in said closed position.

4,706,618

TWO STROKE CYCLE INTERNAL COMBUSTION ENGINE

Franz Laimböck, Graz, Austria, assignor to Steyr-Daimler-Puch Aktiengesellschaft, Vienna, Austria

Filed Nov. 6, 1986, Ser. No. 928,264
Claims priority, application Austria, Nov. 6, 1985, 3198/85
Int. Cl.[4] F02B 33/04
U.S. Cl. 123—73 AA 7 Claims



1. In a two stroke cycle internal combustion engine comprising

a cylinder;

a cylinder head joined to said cylinder at one end thereof;

a hollow piston, which is axially movable in said cylinder and has at one end a piston head, which on one side defines with said cylinder and said cylinder head a combustion chamber and on an opposite side defines the interior of said piston,

a scavengeable crankcase, which is joined to the other end of said cylinder and open to the opposite side of said piston and is adapted to communicate with said combustion chamber during said movement of said piston, and

a fuel injection nozzle for discharging of a jet of fuel during a predetermined movement of said piston into said crankcase,

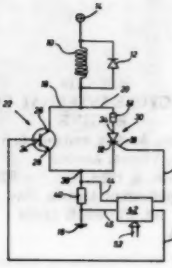
the improvement residing in that said nozzle is arranged to be disposed below a plane defined by said opposite side of said piston head during at least part of said predetermined movement of said piston and is arranged to discharge said jet of fuel into said interior of said piston in such a direction that at least part of said fuel impinges on said opposite side of said piston head.

4,706,619

AUTOMOTIVE VALVE ACTUATION METHOD

Josef Buchl, Rehsteig 12, Lenting, Fed. Rep. of Germany

Filed Apr. 24, 1986, Ser. No. 855,846
Claims priority, application Fed. Rep. of Germany, Apr. 25, 1985, 3515039
Int. Cl.[4] F01L 1/18; H01H 47/32
U.S. Cl. 123—90.11 2 Claims



1. Method of current pulse operation of an actuating assembly associated with a gas intake or exhaust valve in an internal combustion engine, said valve having an actuating solenoid and a ferromagnetic anchor plate attractable thereto, comprising the steps of:

(a) providing a relaxation circuit in parallel with said solenoid and providing a first and second parallel branch current path in series with said solenoid, each branch having a switching element therein, a first branch forming a low capacity current path, both first and second branches together forming a high capacity current path;

(b) energizing said solenoid to capture said anchor plate to hold said valve in a stationary phase by supplying a capture current I_{max} to said solenoid and through the high capacity current path;

(c) permitting said capture current to decay through said relaxation circuit, after said anchor plate capture, to a simulated predetermined threshold value I_2;

(d) switching from the high capacity current path to said low capacity current path after reaching I by the first branch becoming a low impedance branch and the second branch becoming nonconductive;

(e) operating the switching element in said low capacity path to draw a holding current through said solenoid on reaching said threshold value I_2 and shutting off the current at a measured ceiling value I_1 for a selected valve holding time during the stationary phase of said valve action where $I_1 > I_2$ and $I_{max} > I_1$;

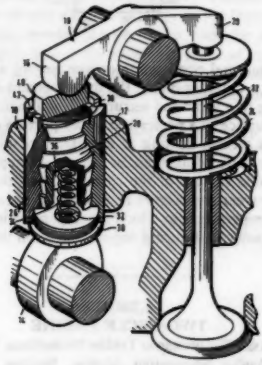
(f) measuring said holding current during said current supply to valve I_1, and allowing holding current decay to a threshold value I_2 by simulating said decay and then repeating steps (d) and (e) for a predetermined time.

4,706,620

AUTOMATIC CLEARANCE ADJUSTER

Peter J. Gill, Wolverhampton, Great Britain, assignor to GKN Technology Limited, Wolverhampton, Great Britain

PCT No. PCT/GB85/00276, § 371 Date Jan. 31, 1986, § 102(e) Date Jan. 31, 1986, PCT Pub. No. WO86/00371, PCT Pub. Date Jan. 16, 1986
PCT Filed Jun. 24, 1985, Ser. No. 829,648
Claims priority, application United Kingdom, Jun. 27, 1985, 8416352; Jun. 27, 1985, 8416354
The portion of the term of this patent subsequent to Oct. 22, 2002, has been disclaimed.
Int. Cl.[4] F01L 1/22
U.S. Cl. 123—90.54 6 Claims



1. A self-contained mechanical automatic clearance adjuster comprising a housing having an internal buttress thread form and a screw member within said housing having an external buttress thread form complementary to and cooperatingly engaged with the internal buttress thread form of the housing, said cooperating thread forms exhibiting a relatively high friction in one direction of axial loading of the screw threads compared with a relatively low friction in the opposite direction of axial loading; a compression spring within said housing acting between a reaction element on the housing at one end thereof and the screw member to bias the screw member in the said opposite direction of axial loading and thus to urge the screw member in a direction outwardly of the other end of the housing; the thread forms being so configured that the screw member will rotate and advance axially of the housing solely under the axial thrust of the compression spring; the buttress thread forms of the housing and the screw member having a helix angle H, a first flank termed a running flank and having a flank angle G_R and a second flank termed a locking flank and having a flank angle G_L satisfying the conditions that:

(a) tan $H > U_{MAX}$ sec G_R;

(b) tan $H < U_{MIN}$ sec G_L; and

(c) cot $G_L > U_{MAX}$ cos H; where

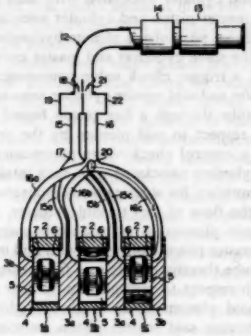
U_{MAX} and U_{MIN} are respectively the highest and lowest expected values of the coefficient of friction between the cooperating flanks of the threads of the housing and the screw member whereby the screw threads exhibit the said high friction between the locking flanks having said second flank angle G_L under axial loads applied to either the housing or the screw member in the said one direction compared with the said low friction between the running flanks having said first flank angle G_R under forces transmitted by the compression spring in the said opposite direction.

4,706,621

INTAKE SYSTEMS FOR ROTARY PISTON ENGINES

Haruo Okimoto, and Seiji Tashima, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Oct. 1, 1986, Ser. No. 914,158
Claims priority, application Japan, Oct. 4, 1985, 60-222333
Int. Cl.[4] F02B 53/04
U.S. Cl. 123—216 13 Claims



1. A rotary piston engine comprising a rotor casing which includes at least three rotor housings each having an inner wall surface of a trochoidal configuration, an intermediate housing located between each adjacent two rotor housings and a side housing attached to an outer surface of each outermost rotor housing so that a rotor cavity of trochoidal configuration is defined in each rotor housing, a substantially polygonal rotor disposed in each rotor cavity with apex portions in sliding contact with the inner wall surface of the rotor housing to define working chambers of cyclically variable volumes upon rotation of the rotor, eccentric shaft means carrying said rotors so that the rotors are angularly offset with each other by equal angular distance, intake means including intake port means provided in said casing to open the rotor cavity in each rotor housing, individual intake passage means having one end connected with each intake port means, junction means connected with the other ends of the respective individual passage means, said individual intake passage means leading to the respective ones of the intake passage means having the same passage length, said individual intake passage means and said junction means having passage lengths which are determined such that a pressure wave produced at one intake port means is transmitted to another intake port means after a time interval corresponding to 180° in terms of angle of rotation of the eccentric shaft means in a normal speed range of engine operation.

4,706,622

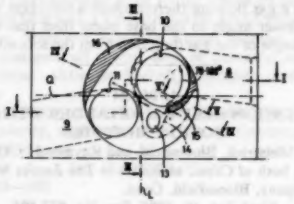
ENGINE COMBUSTION CHAMBER CONSTRUCTION

Martin Cloke, West Bloomfield, Mich.; Michael Horton, Kerpen, Fed. Rep. of Germany; Rudolf Menne, Gladbach, Fed. Rep. of Germany, and Andreas Stwiorok, Cologne, Fed. Rep. of Germany, assignors to Ford Motor Company, Dearborn, Mich.

Filed Dec. 1, 1986, Ser. No. 936,577
Claims priority, application Fed. Rep. of Germany, Dec. 5, 1985, 3542965
Int. Cl.[4] F02B 31/00, 23/00
U.S. Cl. 123—306 2 Claims

1. A mixture-compressing spark-ignited four stroke internal combustion engine having a combustion chamber bounded by a piston and a cylinder head, and inlet and exhaust valves, the valve openings being offset from the centerline of the bore in plan view in the longitudinal direction of the engine with respect to a transverse plane of the cylinder, and valve stems angled at an acute angle with respect to each other when projected onto the transverse plane of the cylinder, the engine including a spark plug and means projecting into the combustion chamber providing a squish area opposite the spark plug, and means providing a partially masked inlet valve opening connected to a swirl inlet passage, characterized in

the swirl inlet passage being so constructed and arranged as to pass any fluid therein therethrough tangentially into the inlet valve opening, the spark plug being disposed close to the center of the cylinder on the side of the bore centerline



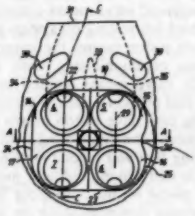
adjacent to and facing the inlet valve opening, the squish area opposite the spark plug being in the range of between 5% and 15% of the cylinder cross-sectional area, and means projecting downwardly from the top of the combustion chamber and from the downstream flow area of the inlet valve opening towards the outer periphery of the cylinder bore through a circumferential angle of between 70° and 180° at a height of between 70% and 100% of the total valve stroke and over a gap width of between 1 and 1.5 mm between the projecting means and the piston.

4,706,623

CYLINDER HEAD FOR AN INTERNAL COMBUSTION ENGINE

Bengt Gadefelt, and Lars Sääf, both of Södertälje, Sweden, assignors to Saab-Scania Aktiebolag, Sweden

Filed May 21, 1985, Ser. No. 736,372
Claims priority, application Sweden, May 22, 1984, 8402749
Int. Cl.[4] F02B 31/00
U.S. Cl. 123—308 10 Claims



1. A cylinder head for an internal combustion engine having at least one cylinder with a reciprocating piston, said cylinder head having a base plane and accommodating a combustion chamber for the cylinder with valve-regulated ports, which, when projected on a circular surface in the base plane of the cylinder head facing towards the cylinder are distributed with a port in each of four quadrants, so that with the quadrants numbered clockwise, the ports at a first and a second inlet duct are situated in a first and second quadrant, respectively, and so that the ports of a first and a second exhaust duct are situated in a third and a fourth quadrant, respectively, and said combustion chamber having an interior surface facing the base plane, a portion of said interior surface between the port of the second inlet duct and the port of the first exhaust duct being formed with an inwardly curved ridge which extends from a

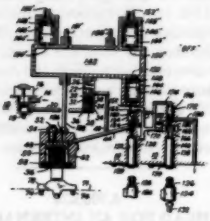
central portion of said interior surface downwardly to its intersection with the base plane, defining a protrusion having a bottom surface parallel to said base plane, said protrusion extending radially towards the cylinder axis, and in that the remaining interior surfaces of the combustion chamber, where intersecting the base plane, lack such protrusions, characterized in that said ridge extends along the interior surface of the combustion chamber at least to a vicinity of a line extending between a center of the second inlet port and a center of the first exhaust duct port and in that the inlet ducts are asymmetrically formed in relation to each other such that the first inlet duct gives a gas flowing therethrough a direction with a substantially lesser angle to the base plane than that of a corresponding angle of the gas direction from the second inlet duct.

4,706,624

COMPRESSION RELEASE RETARDER WITH VALVE MOTION MODIFIER

Zdenek S. Meistrick, Bloomfield, and Raymond N. Quenneville, Suffield, both of Conn., assignors to The Jacobs Manufacturing Company, Bloomfield, Conn.

Filed Jun. 10, 1986, Ser. No. 872,494
Int. Cl.[4] F02D *9/06*
U.S. Cl. 123—321 **22 Claims**



1. In an engine retarding system of a gas compression release type including an internal combustion engine having a pressurized lubricating oil system, intake valve means, exhaust valve means, and pushtube means associated with each of said intake valve means and exhaust valve means, hydraulically actuated slave piston means associated with said exhaust valve means to open said exhaust valve means at a predetermined time, control valve means and solenoid valve means communicating in series with said pressurized lubricating oil system and said hydraulically actuated slave piston means, the improvement comprising plenum means communicating with said slave piston means, first check valve means located between said slave piston means and said plenum means to permit flow of hydraulic fluid only from said slave piston means into said plenum, driving cylinder means communicating with said plenum, free piston means having first and second ends mounted for reciprocatory motion in said driving cylinder means, spring means biasing said free piston means outwardly from said plenum, said free piston means communicating on said first end with said plenum means, first master cylinder means aligned with said exhaust valve pushtube means and communicating with said second end of said free piston means, first master piston means mounted for reciprocatory motion in said first master cylinder means and adapted to be driven by said exhaust valve pushtube means, trigger check valve means aligned with said first master piston means and communicating between said slave piston means and said second side of said free piston means to permit flow of hydraulic fluid from said slave piston means toward said free piston means, means contacting said first master piston means and adapted to open said trigger check valve means at a predetermined point during the travel of said first master piston means, second master cylinder means aligned with said intake valve pushtube means, second master piston means mounted for reciprocatory motion in said second master cylinder means and adapted to be driven by said intake valve pushtube means, and control check valve means communicating between said second end of said free piston means and said second master cylinder means.

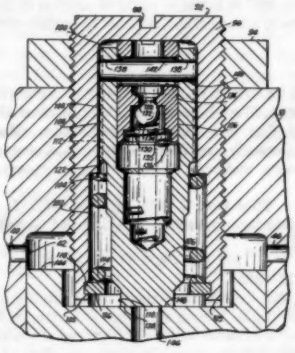
21. A process for compression release retarding of a cycling multi-cylinder four cycle internal combustion engine having a crankshaft and an engine piston operatively connected to said crankshaft for each cylinder thereof and having intake and exhaust valves and intake and exhaust pushtubes for each cylinder thereof, said engine having, in addition, an hydraulic slave piston and cylinder associated with each exhaust valve, an hydraulic master piston and cylinder associated with each intake and exhaust pushtube, a plenum hydraulically interconnected with the slave cylinders and master cylinders through check valves, a trigger check valve communicating between the said plenum and said master cylinder associated with each exhaust pushtube through a free piston biased to move outwardly with respect to said plenum by the pressure in said plenum, and a control check valve communicating between said master cylinders associated with each intake and exhaust pushtube comprising, for at least one cylinder thereof, the steps of reducing the flow of fuel to said cylinder, increasing the pressure in said plenum so as to absorb energy therein by driving said master piston associated with said intake pushtube by said pushtube thereby biasing said free piston in an inward direction with respect to said plenum, further increasing the pressure in said plenum so as to absorb additional energy therein by driving said master piston associated with said exhaust pushtube by said exhaust pushtube thereby further biasing said free piston in an inward direction with respect to said plenum, releasing said energy absorbed in said plenum from said plenum at a predetermined point in the travel of said master piston associated with said exhaust pushtube by opening said trigger check valve interposed between said plenum and said exhaust valve slave piston, and applying said absorbed energy to said exhaust valve slave piston through the motion of said free piston outwardly with respect to said plenum and biased by the pressure in said plenum when said engine piston is approaching its top dead center position during a compression stroke of the said cycling multi-cylinder four stroke cycle engine.

4,706,625

ENGINE RETARDER WITH RESET AUTO-LASH MECHANISM

Zdenek S. Meistrick, Bloomfield, and Robert B. Price, Manchester, both of Conn., assignors to The Jacobs Manufacturing Company, Bloomfield, Conn.

Filed Aug. 15, 1986, Ser. No. 897,037
Int. Cl.[4] F02D *13/04*
U.S. Cl. 123—321 **5 Claims**



1. In an engine retarding system of a gas compression release type including an internal combustion engine having exhaust

valve means and pushtube means, hydraulic pressure supply means, hydraulically actuated first piston means having high and low pressure sides associated with said exhaust valve means to open said exhaust valve means at a predetermined time and movable between first and second positions, second piston means actuated by said pushtube means and hydraulically interconnected with said first piston means, and adjustable stop means disposed in abutment with said first piston means when said first piston means is in its said first position, the improvement comprising fluid passageway means formed through said first piston means between said high and said low pressure sides thereof, reset valve means positioned substantially within said adjustable stop means for reciprocating motion therewith, said reset valve means having a valve face formed on one end thereof and adapted to seat against said high pressure side of said first piston means thereby sealing said fluid passageway means, first biasing means adapted to bias said reset valve means toward said first piston means, second biasing means adapted to bias said reset valve means away from said first piston means when said first piston means approaches its said second position, third piston means mounted within said reset valve means for reciprocating motion therewith and movable between first and second positions, said first biasing means also adapted to bias said third piston means toward said second position of said third piston means, said third piston means having passageway means formed therethrough, and check valve means located in said passageway means of said third piston means and adapted to hydraulically lock said third piston means in said second position.

4,706,626

FUEL INJECTION PUMP FOR INTERNAL COMBUSTION ENGINES

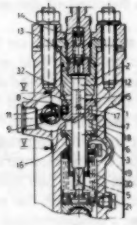
Walter Häfele, Fellbach, and Josef Güntert, Gerlingen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Aug. 23, 1985, Ser. No. 768,775

Claims priority, application Fed. Rep. of Germany, Oct. 1, 1984, 3435987

Int. Cl.[4] F02D *1/02*

U.S. Cl. 123—364 **14 Claims**



1. A fuel injection pump for internal combustion engines comprising a plurality of reciprocating in-line pump pistons, each of said pump pistons having at least one relief bore and guided in separate pump cylinders, pump work chambers in each of said cylinders, axially movable control slides for controlling said at least one relief bore in each of said pistons, first and second rotatable interrelated governor rods, driver members disposed on said first and second rotatable governor rods adapted to actuate said control slides relative to said pistons, said driver members comprising a first and second group of driver members,

said first governor rod arranged to carry and move said first group of said driver members which arbitrarily moves said control slide into a position when said at least one relief bore of one of said pistons is constantly open, and said second governor rod is arranged to carry and move said second group of driver members that simultaneously controls normal operation;

and said first and second governor rods are rotatably positioned one within the other, said second governor rod being a tubular body with an inner wall and provided with radially extending openings to receive said driver members of said first governor rod.

4,706,627

SPEED GOVERNOR FOR INJECTION PUMPS IN INTERNAL COMBUSTION ENGINES

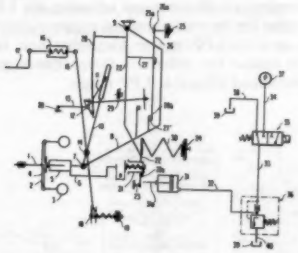
Georg Eltze, Stuttgart; Wendelin Kluegl, Kernen, and Frank Thoma, Stuttgart, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Apr. 16, 1984, Ser. No. 601,022

Claims priority, application Fed. Rep. of Germany, Apr. 15, 1983, 3313632

Int. Cl.[4] F02M *39/00*

U.S. Cl. 123—365 **16 Claims**



1. A speed governor for fuel injection pumps of an internal combustion engine having a centrifugal device adjusting a governor collar as a function of speed, which device acts on a transmission lever against the force of a main control spring to set a maximum speed for the internal combustion, said transmission lever having a first end, said main control spring applying its force to the transmission lever at a point located away from said first end, said main control spring being supported at an adjustable counterbearing mechanism for adjusting the fuel regulating force of said main control spring, at least one intermediate lever transmitting motions from the transmission lever to regulate a fuel delivery volume adjusting member of the injection pump, a hydraulically operable cylinder connected to and applying a force to said first end of the transmission lever in a direction parallel to that of the main control spring force wherein the fuel regulating motion of the transmission lever caused by the main control spring force is increased for reaching a short term increased nominal speed of the internal combustion engine over the set maximum speed when the hydraulically operated cylinder is actuated, and wherein the governor collar, in response to the centrifugal device, acts on the transmission lever in opposition to the parallel forces produced by the main control spring and the hydraulically actuated cylinder to cause fuel to be reduced when the increased nominal speed is reached.

4,706,628

ENGINE COMBUSTION CONTROL RESPONSIVE TO LOCATION AND MAGNITUDE OF PEAK COMBUSTION PRESSURE

Douglas E. Trombley, Richmond, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 29, 1986, Ser. No. 946,952

Int. Cl.[4] F02D *43/00*

U.S. Cl. 123—425 **2 Claims**

1. A combustion control for an internal combustion engine

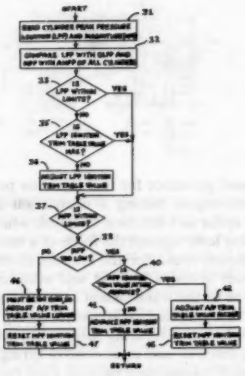
of the type having a plurality of combustion chambers, means for supplying a combustible charge to and igniting the combustible charge within each combustion chamber, power output apparatus including a rotating crankshaft, and means for sensing the crankshaft angle (LPP) and magnitude (MPP) of peak combustion pressure for each combustion chamber, the combustion control comprising, in combination:

means for deriving the average magnitude of peak combustion pressure (AMPP) for all combustion chambers;

means for determining, from the sensed values of predetermined engine operating parameters, base values for the combustible charge mixture and ignition timing, relative to the rotating crankshaft, for each combustion chamber;

memory means for storing tables of LPP ignition trim values, MPP ignition trim values and A/F trim values for each combustion chamber as a function of predetermined ranges of at least some of the predetermined engine operating parameters, the LPP and MPP ignition trim values having predetermined limits;

means for comparing the sensed LPP value for each combustion chamber with a desired LPP value (DLPP) for that combustion chamber and adjusting the LPP ignition trim value for the predetermined engine operating parameters, up to the LPP ignition trim value limit, in the direction to reduce the difference therebetween at least to a predetermined allowable LPP range;



means for comparing the MPP value for each combustion chamber with the average magnitude of peak combustion pressure for all combustion chambers (AMPP) and determining whether the difference is within a predetermined allowable MPP range;

means effective, if the MPP value is too low for the allowable MPP range and the MPP ignition trim value is at the MPP ignition trim value limit in the advance direction, to adjust the A/F trim value in the rich direction and reset the MPP ignition trim value;

means effective, if the MPP value is too low for the allowable MPP range and the MPP ignition trim value is not at the MPP ignition trim value limit in the advance direction, to adjust the MPP ignition trim value in the advance direction;

means effective, if the MPP value is too high for the allowable MPP range, to adjust the A/F trim value in the lean direction and reset the MPP ignition trim value;

means for determining the combustible charge mixture for each combustion chamber from the base value thereof and the A/F trim value for the sensed predetermined engine operating parameters;

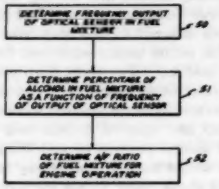
means for determining the ignition timing for each combustion chamber from the base value thereof and the LPP and MPP ignition trim values for the sensed predetermined engine operating parameters.

4,706,629

CONTROL SYSTEM FOR ENGINE OPERATION USING TWO FUELS OF DIFFERENT VOLUMETRIC ENERGY CONTENT

Richard J. Wineland, Dearborn; Roberta J. Nichols, Plymouth, and Eric L. Clinton, Southfield, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Feb. 7, 1986, Ser. No. 826,958
Int. Cl.[4] F02D 41/34; F02M 43/00
U.S. Cl. 123—478 **1 Claim**


DETERMINE FREQUENCY OUTPUT OF OPTICAL SENSOR IN FUEL MIXTURE
50
DETERMINE PERCENTAGE OF ALCOHOL IN FUEL MIXTURE AS A FUNCTION OF FREQUENCY OF OUTPUT OF OPTICAL SENSOR
51
DETERMINE A/F RATIO OF FUEL MIXTURE FOR ENGINE OPERATION
52

1. A method for controlling the amount of a fuel mixture, including a methanol and a gasoline fuel of different volumetric energy content, to be supplied to an internal combustion engine, said method controlling the amount of a fuel mixture during open and closed loop engine control operation including the steps of:

sensing a parameter related to the percentage of the methanol fuel in the fuel mixture;

determining the percentage of the methanol fuel in the fuel mixture;

determining a first stoichiometric air fuel ratio for the methanol fuel as a function of the energy content of the methanol fuel;

determining a second stoichiometric air fuel ratio for the gasoline fuel as a function of the energy content of the gasoline fuel;

determining a third stoichiometric air fuel ratio for the fuel mixture as a function of the first stoichiometric air fuel ratio for the methanol fuel and the second stoichiometric air fuel ratio for the gasoline fuel as a function of the energy content of the fuel mixture;

generating an output signal for controlling air fuel ratio as a function of the third stoichiometric air fuel ratio and adjusting the volume of the fuel mixture introduced into the engine in accordance with the energy content of the fuel mixture so that a predetermined amount of energy as introduced into the engine during all engine operating conditions including crank mode, underspeed mode, closed throttle mode and wide open throttle mode;

sensing a parameter related to the percentage of the methanol fuel in the fuel mixture including measuring the index of refraction of the fuel mixture by an optical sensor positioned in the fuel mixture and determining the frequency of an electrical output signal from the optical sensor;

determining a third desired air fuel ratio including the step of interpolating between the first and second desired air fuel ratios for the methanol and gasoline fuels to determine the third desired air fuel ratio for the fuel mixture; and

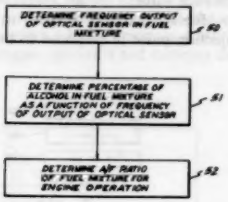
wherein the step of interpolating includes maintaining the desired third ratio of the air to the fuel mixture in accordance with the formula: desired third air fuel ratio=(6.4) (PM)+(14.64) (1−PM) wherein PM=(percentage of methanol)/100.

4,706,630

CONTROL SYSTEM FOR ENGINE OPERATION USING TWO FUELS OF DIFFERENT VOLATILITY

Richard J. Wineland, Dearborn; Roberta J. Nichols, Plymouth, and Eric L. Clinton, Southfield, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Feb. 7, 1986, Ser. No. 827,123
Int. Cl.[4] F02D *41/04*
U.S. Cl. 123—478 **4 Claims**


DETERMINE FREQUENCY OUTPUT OF OPTICAL SENSOR IN FUEL MIXTURE
50
DETERMINE PERCENTAGE OF ALCOHOL IN FUEL MIXTURE AS A FUNCTION OF FREQUENCY OF OUTPUT OF OPTICAL SENSOR
51
DETERMINE AIR RATIO OF FUEL MIXTURE FOR ENGINE OPERATION
52

1. A method for controlling the amount of a fuel mixture, including a first and second fuel of different volatility, to be supplied to an internal combustion engine during both open loop and closed loop operation, said method including the steps of:

determining the amount of air charge per intake stroke of the internal combustion engine;

determining the percentage of the first fuel in the fuel mixture;

calculating a stoichiometric air to fuel ratio of the fuel mixture based on the percentage of the first fuel in the fuel mixture;

calculating a base amount of fuel mixture needed to achieve the stoichiometric air to fuel ratio at a predetermined engine operating condition using the calculated stoichiometric air to fuel ratio and the amount of air charge; and

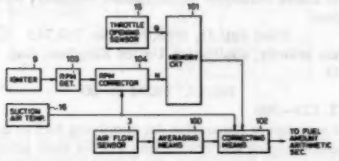
modifying the above calculated base amount of fuel mixture needed to achieve the stoichiometric air to fuel ratio as a function of the engine coolant temperature of the internal combustion engine, engine speed and as a function of the percentage of the first fuel.

4,706,631

FUEL INJECTION CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE

Seiji Wataya, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 2, 1986, Ser. No. 914,403
Claims priority, application Japan, Oct. 2, 1985, 60-218138
Int. Cl.[4] F02D *41/18*
U.S. Cl. 123—488 **5 Claims**



1. A fuel injector control apparatus comprising:

an air-flow sensor for detecting a quantity of suction air supplied to an internal combustion engine;

an injector for injecting fuel into said engine;

a controller for controlling a quantity of said injected fuel responsive to an output of said air-flow sensor;

a throttle valve for regulating the quantity of said suction air;

throttle valve opening detecting means for detecting the opening of said throttle valve;

rotational frequency detecting means for detecting the rotational frequency of said engine;

means for measuring the temperature of said suction air;

first correcting means responsive to outputs of said throttle valve opening detecting means and said rotational frequency detecting means for correcting said output of said air-flow sensor in a return blow region of said engine;

second correcting means responsive to outputs of said first correcting means and of said temperature measuring means for further correcting said output of said air-flow sensor;

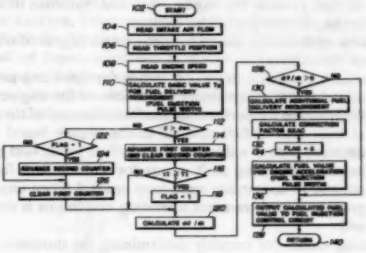
means responsive to an output of said second correcting means for determining the quantity of said injected fuel.

4,706,632

FUEL CONTROL APPARATUS FOR INTERNAL COMBUSTION ENGINE

Mitsuru Kasanami, and Hideyuki Tamura, both of Yokohama, Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Oct. 27, 1986, Ser. No. 925,151
Claims priority, application Japan, Oct. 28, 1985, 60-239563
Int. Cl.[4] F02D *41/10*
U.S. Cl. 123—492 **13 Claims**



1. An apparatus for use with an internal combustion engine including a throttle valve situated in an induction passage connected through an intake manifold to a plurality of cylinders, comprising:

means for controlling the amount of fuel supplied to said engine at a position upstream of said intake manifold;

sensor means sensitive to a condition of said engine for producing a sensor signal indicative of said engine condition;

a control circuit responsive to said sensor signal for determining a value corresponding to a setting of said means for controlling the amount of fuel to said engine, said control circuit including means for determining a first value corresponding to the amount of fuel supplied to said engine based upon engine load and speed, means responsive to a demand for engine acceleration for determining a second value corresponding to the amount of supplemental fuel supplied to said engine, means for measuring a first time period during which said throttle valve remains at angles greater than a predetermined value, means for measuring a second time period after said throttle valve closes to said predetermined angle until a demand for engine acceleration occurs again, means for decreasing said second value when said first time period (T1) is greater than a predetermined value (T1) and said second time period is less than a predetermined value, and means for summing said first and second values to calculate said value corresponding to a setting of said means for controlling the amount of fuel to said engine; and

means for converting said calculated value into a setting of said means for controlling the amount of fuel to said engine.

4,706,633

AIR/FUEL RATIO FEEDBACK CONTROL SYSTEM ADAPTED TO TEMPORARY OPEN-LOOP CONTROL UNDER TRANSIENT CONDITIONS

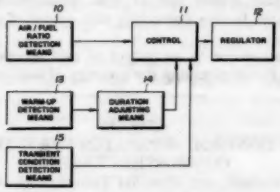
Toyoaki Nakagawa, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Apr. 14, 1986, Ser. No. 851,104

Claims priority, application Japan, Apr. 22, 1985, 60-86159

Int. Cl.[4] F02M *17/00*

U.S. Cl. 123—491 **7 Claims**



1. A control system for feedback control of the air/fuel ratio of an air-fuel mixture supplied to an internal combustion engine, the control system comprising:

air/fuel ratio detection means for detecting actual values of air/fuel ratio in the engine from concentratins of oxygen in the exhaust gas of the engine;

warm-up detection means for detecting a degree of warm-up of the engine;

transient condition detection means for detecting predetermined transient operating conditions of the engine;

control means for performing feedback control of the feed of at least one of fuel and air to the engine based on the detected actual values of the air/fuel ratio, said control means comprising shift means for shifting said feedback control to temporary open-loop control when any of sad predetermined transient operating conditions is detected; and

timing means for variably determining the duration of said temporary open-loop control of the air/fuel ratio according to the detected degree of warm-up of the engine, said timing means comprising means for memorizing a set of values of said duration respectively assigned to different degrees of warm-up of the engine and means for making a selection from said set of values based on the degree of warm-up of the engine detected by said warm-up detection means;

said shift means shifting said open-loop control to said feedback control after the lapse of a time the length of which has a predetermined relation to said duration determined by said timing means;

wherein said set of values of said duration comprises a first set of values which are to be employed when the detected transient operating condition of the engine is an accelerating condition and a second set of values which are to be employed when the detected transient operating condition is a decelerating condition.

4,706,634

FUEL-INJECTION CONTROL SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Toshihide Nishikawa; Kenichirou Hanada, both of Hiroshima Prefecture; Yukinobu Nishimura, and Setsuhiro Shimomura, both of Himeji City, all of Japan, assignors to Mazda Motor Corporation and Mitsubishi Denki Kabushiki Kaisha, both of, Japan

Filed Nov. 13, 1986, Ser. No. 930,010

Claims priority, application Japan, Nov. 13, 1985, 60-254073

Int. Cl.[4] F02D *41/10*; **F02M** *51/00*

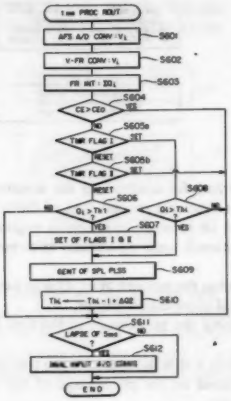
U.S. Cl. 123—492 **8 Claims**

1. A fuel-injection control system for an internal combustion engine in which a basic pulse width, being calculated from the amount of intake air sucked into an internal combustion engine and the number of engine revolutions, is generated in synchronization with engine revolution, and a series of special injection pulses are generated independently of the generation timing of said basic injection pulse width for revision of engine acceleration, said fuel-injection control system comprising:

an arithmetic operation means for calculating an engine load from the amount of intake air sucked into said engine and the number of engine revolutions;

a judging means for judging whether or not a parameter representative of the engine load is less than a predetermined reference value;

a first pulse-generating means adapted to generate a first special injection pulse in response to the amount of the intake air when said judging means judges that said parameter is less than the predetermined reference value;



a second pulse-generating means adapted to revise said engine acceleration outside a pulsation range in which the amount of the intake air pulsates during a first predetermined period of time starting from the generation of the first special injection pulse and to generate a series of special injection pulses; and

a revision-prohibiting means for prohibiting the revision of engine acceleration in said pulsation range of the intake air during a second predetermined period of time exceeding said first predetermined period starting from the generation of the first special injection pulse.

4,706,635

FUEL PUMPING APPARATUS

Francis R. Draper, Buckhurst Hill; John H. Francis, Cheltenham, and Alan P. Ogburn, Cirencester, all of England, assignors to Lucas Industries public limited company, Birmingham, England

Filed Jul. 31, 1985, Ser. No. 760,762

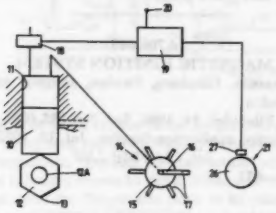
Claims priority, application United Kingdom, Aug. 10, 1984, 8420413

Int. Cl.[4] F02M *39/00*

U.S. Cl. 123—506 **3 Claims**

1. In a pumping apparartus for supplying fuel to an internal combustion engine and comprising a drive shaft adapted to be coupled to a rotary part of an engine to which fuel is to be supplied, a pumping plunger reciprocable within a bore, a cam coupled to the drive shaft and arranged to impart inward pumping movement to the plunger as the shaft rotates, said cam including a camlobe defining a leading flank and a trailing flank, the leading flank imparting inward movement ot the plunger during forward rotation of the engine, a distributor member coupled to the drive shaft for distributing fuel displaced from the bore to a plurality of outlet ports in turn

during successive inward movements of the plunger, means for supplying fuel to the bore, an electrically controlled valve through which fuel can escape from the bore during inward movement of the plunger, the valve being closed to cause delivery of fuel through an outlet, electrical circuit means for controlling the operation of said valve, said circuit means being responsive to various engine operating parameters and desired operating parameters so as to control the timing of fuel delivery and the quantity of fuel supplied to the engine and transducer means for supplying signals to the circuit means indicative of the angular position of the drive shaft, the improvement in combination therewith which comprises: a safety means for detecting reverse engine operation and ensuring that said elec-



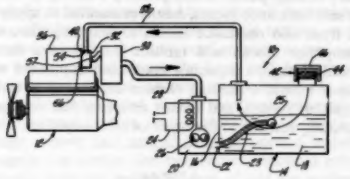
trically controlled valve is opened during such reverse operation in a manner which prevents formation of a hydraulic lock and the supplying of fuel to the engine, said safety means including signal generating means mounted on said transducer in a location which provides plunger position signals when the plunger is located substantially midway along the flank of the cam lobe which is the trailing flank when the engine is operating in the forward-running condition and which is the leading flank when the engine is operating in a reverse-running condition, said plunger position signals being adapted to result in said electrically controlled valve closing only after the plunger has passed the crest of the lobe and is moving down the normal leading face of the cam lobe and outwardly during reverse engine operation.

4,706,636

PURGE AND PRIME FUEL DELIVERY SYSTEM AND METHOD

Leland L. Davis, Saline, Mich., assignor to Davco Manufacturing Corporation, Ann Arbor, Mich.

Filed Dec. 6, 1984, Ser. No. 679,375
Int. Cl.[4] F02M *53/00*
U.S. Cl. 123—557 **12 Claims**



1. A method of preventing fuel clogging in a fuel delivery system of a combustion device due to exposure to low temperatures, said fuel delivery system of the type having a fuel tank and a fuel supply conduit for transmitting said fuel from said fuel tank to said combustion device and a fuel pump for pumping said fuel from said fuel tank to said combustion device comprising the steps of;

providing a vent means for said fuel supply conduit,

purging said fuel supply conduit of fuel when said combustion device is inoperative, said vent means acting to supply gas to said fuel supply conduit during said purging step, whereby substantially all of said fuel is removed from said fuel supply conduit and returned to said fuel tank such that said fuel supply conduit is not subjected to fuel waxing or clogging therein caused by said exposure to low temperatures, and

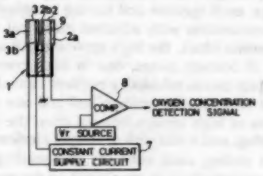
priming said fuel supply conduit with said fuel prior to operating said combustion device by energizing said fuel pump, said vent means acting to provide an escape for gases trapped in said fuel supply conduit whereby said fuel is available for said combustion device.

4,706,637

OXYGEN CONCENTRATION SENSING DEVICE FOR AN AIR-FUEL RATIO CONTROL SYSTEM OF AN AUTOMOTIVE INTERNAL COMBUSTION ENGINE

Masahiko Asakura, Tokorozawa; Tomohiko Kawanabe, Utsunomiya; Noritaka Kushida, Tokyo, and Hiroshi Hasebe, Hatogaya, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 25, 1986, Ser. No. 843,951
Claims priority, application Japan, Apr. 25, 1985, 60-89647
Int. Cl.[4] F02M *23/06, 23/08*
U.S. Cl. 123—589 **2 Claims**



1. An oxygen concentration sensing device for use in an air/fuel ratio control system for an internal combustion engine in which a target air/fuel ratio is determined in accordance with at least one of the operational parameters of said internal combustion engine and in which an air/fuel ratio of a supplied mixture is controlled toward the target air/fuel ratio in response to an oxygen concentration in the exhaust gas, comprising:

an oxygen concentration sensor unit disposed in an exhaust passage of said internal combustion engine, said oxygen concentration sensor unit including an oxygen pump element and a sensor cell element which define a restricted region therebetween and each of which comprises a solid electrolyte member having oxygen ion permeability and has a pair of electrodes provided on both sides thereof;

current supply means for supplying a pump current, which has a magnitude defined in accordance with the target air/fuel ratio, across the electrodes of said oxygen pump element thereby causing said sensor unit to generate a sensor voltage across the electrodes of said sensor cell element which is substantially in proportion to the oxygen concentration in the exhaust gas; and

comparing means for comparing said sensor voltage with a predetermined reference voltage, and producing an output signal representing the result of the comparison as an oxygen concentration detection signal.

4,706,638

IGNITION UNIT IN THE IGNITION SYSTEM OF AN INTERNAL COMBUSTION ENGINE

Sven H. Johansson, and Jan G. Nytomt, both of Åmål, Sweden, assignors to Saab-Scania Aktiebolag, Sodertalje, Sweden

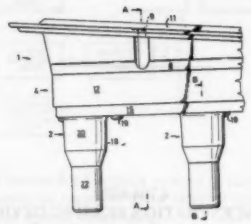
Division of Ser. No. 719,272, filed as PCT SE84/00243, Jun. 28, 1984, published as WO85/00930, Feb. 28, 1985, Pat. No. 4,617,907.

This application Jun. 27, 1986, Ser. No. 880,926

Claims priority, application Sweden, Aug. 5, 1983, 8304283

Int. Cl.[4] F02P *3/02*

U.S. Cl. 123—647 9 Claims



1. A cartridge unit included in an ignition system of an internal combustion engine and connectible to a plurality of spark plugs in the engine, said cartridge unit comprising an upper part securable to adjacent engine parts, a number of finger-like connection casings detachably mounted to the upper part and extending from the upper part, one casing, for each spark plug, said connection casings and upper part, when attached to each other, forming together an outer shell with an essentially closed inner space encapsulating a high tension block comprising at least one ignition coil for generating ignition voltage, each ignition coil having a cable-free detachable electrical connection with adjacent electrical components in the high tension block, the high tension block also comprising a number of contact means, one in each connection casing, which contact means establish a resilient cable-free detachable connection between one ignition coil and one spark plug, for transmission of high tension current from the ignition coil to the spark plug, and a plurality of sealing elements, one for each connection casing, each sealingly surrounding a spark plug when the cartridge unit is connected to the spark plug.

4,706,639

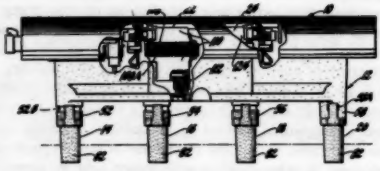
INTEGRATED DIRECT IGNITION MODULE

James A. Boyer; Bobbie D. Bridgewater, both of Anderson, Ind.; Donald C. Warner, Byron, and Jerry L. Sturdivant, Rochester Hills, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Dec. 4, 1986, Ser. No. 937,941

Int. Cl.[4] F02P *15/00*

U.S. Cl. 123—647 7 Claims



1. An ignition module that is adapted to be mounted on an internal combustion engine and which is operative to electrically connect the secondary winding of an ignition coil to a spark plug of the engine comprising, a housing formed of electrical insulating material having a wall that faces the spark plug when the module is mounted on an engine, a metallic cover secured to said housing, said cover being adapted to be secured to said engine, an ignition coil disposed within said housing and cover having a laminated magnetic core and a secondary winding, said magnetic core being clamped between said housing and said metallic cover with a portion of said core directly engaging said cover whereby said core has a direct heat transfer path to said cover and is electrically connected to said cover, a tubular member formed of insulating material secured to said wall, said tubular member carrying a conductor means that is adapted to engage a terminal of a spark plug, the tubular member being positioned to slip over the spark plug when the module is assembled to the engine, and means connecting said secondary winding to said conductor means that is carried by said tubular member and which is adapted to engage a terminal of said spark plug.

4,706,640

MAGNETIC IGNITION SYSTEM

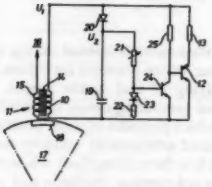
Bo C. Andreasson, Göteborg, Sweden, assignor to AB Electrolux, Sweden

Filed Jul. 14, 1986, Ser. No. 885,408

Claims priority, application Sweden, Jul. 19, 1985, 8503534

Int. Cl.[4] F02P *1/08*

U.S. Cl. 123—651 6 Claims



1. In a magnetic ignition system for an internal combustion engine, wherein the ignition system comprises an ignition coil having a primary winding and a secondary winding, a permanent magnet movable with respect to the coil to generate a pulsatory voltage in the primary winding, an ignition switch having a control electrode and being serially coupled to the primary winding, and a control circuit coupled to said primary winding and to the control electrode of said ignition switch, for maintaining said ignition switch conductive during ascending curve portions of the voltage of said primary winding, the improvement wherein said control switch comprises an amplifier having an output coupled to said control electrode of said ignition switch, said control circuit comprising a series circuit of resistance means and rectifying means connected to receive at least a portion of the primary winding voltage of said coil, whereby voltage pulses of said primary winding are developed across said resistance means, means connected to apply voltage pulses from said resistance means to said amplifier, whereby said amplifier blocks said ignition switch at a determined threshold voltage, a capacitor connected in parallel with said resistance means, a limiting resistor connected in series with said ignition switch, and means coupling the voltage across said limiting resistor to the input of said amplifier.

4,706,641

AUTOMATIC CLAY TARGET FEEDER ATTACHMENT FOR TRAP SHOOTING MACHINES

Roger J. Cote, and Ronald P. Cote, both of R #7 Box 540, Augusta, Me. 04330

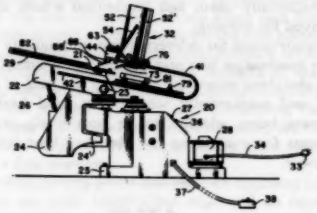
Filed Apr. 24, 1986, Ser. No. 855,270

Int. Cl.[4] F41B *3/04*

U.S. Cl. 124—8 3 Claims

1. In combination, a trap shooting machine comprising base, laterally-shiftable and top vertically-adjustable housings assembled upon one another for relative movement therebetween, a releasable spring-based drive shaft extending vertically from the top housing, a target flinger arm extending

laterally from the releasable drive shaft, a clay target feeder attachment mounted upon the top housing and overlying the flinger arm when in its loading position, said clay target feeder attachment having a column structure for containing clay targets stacked upon one another, automatic means carried upon the column structure for releasing the clay targets one at



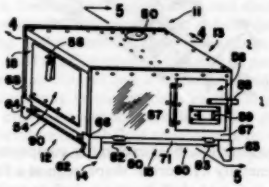
a time in response to the release of the flinger arm and upon the flinger arm being returned to its loading position and a selector control arrangement operable in connection with the automatic target releasing means to cause either one or two targets to be loaded upon the flinger arm prior to its release whereby the trap machine may be automatically and selectively loaded for single or double flinging of the targets by the flinger arm.

4,706,642

FOLDING CAMP STOVE/OVEN APPARATUS

Graham D. Sims, and G. Wyatt Sims, both of P.O. Box 21405, Billings, Mont. 59104

Filed May 22, 1986, Ser. No. 865,868
Int. Cl.[4] F24C *1/16*
U.S. Cl. 126—9 R **10 Claims**



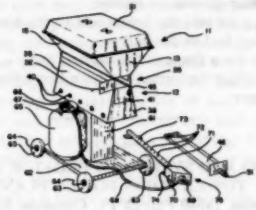
1. Folding camp stove/oven apparatus including a first housing portion, a second housing portion, a leg portion and leg retaining portion; said first housing portion including a quadrangular bottom section and two sidewall sections extending upwardly from opposite edges of said bottom section, a divider section having the same configuration as said sidewall sections and extending upwardly from said bottom section intermediate said sidewall sections and substantially parallel thereto, said sidewall and divider sections being pivotally connected to said bottom section through full length piano type hinge means; said second housing portion including a quadrangular top section and two endwall sections extending downwardly from the opposite edges of said top section, said endwall sections being pivotally connected to said top section through full length piano type hinge means, U-shaped flange sections extending perpendicularly along each free edge of said top and endwall sections, said U-shaped flange sections being integrally formed with said top and endwall sections, an elongated U-shaped sealing section extending downwardly from said top section between said endwall sections and substantially perpendicular thereto, said U-shaped sections being engageable with free edges of said bottom, divider and sidewall sections, single flange sections extending from edges of said top section adjacent said endwall sections and bearing against same, a smoke pipe opening located in said top section adjacent one hinge means and adjacent said elongated U-shaped section, a first opening in one of said sidewall or endwall sections providing access to the interior of said apparatus, a second opening in another of said sidewall or endwall sections, said second opening being located remote from said first opening and remote from said smoke pipe opening but communicating therewith, a pivotally connected cover member disposed over each of said first and second openings; said leg portion including a pair of leg assemblies, each of said leg assemblies including two leg members spaced to engage adjacent lower corners of said apparatus, said leg members having a right angle cross section, spaced parallel connector members joining said leg members, a first connector member joining upper sections of first faces of said leg members disposed in the same plane, a second connector member spaced lower than said first connector member joining spaced parallel second faces of said leg members disposed substantially perpendicular to said first faces thereof, the spacing between said connector members being sufficient to permit sliding of said leg assemblies over said combined first and second housing portions when folded in a flat configuration; said leg retaining portion including first retaining means including a pair of spaced open channel members disposed along an outwardly facing lower edge of said bottom section and selectively engageable with said first connector member and second retaining means including a pair of spaced biasing clip members extending downwardly for said bottom section spaced from said bottom section edge and selectively engageable with said second connector member.

4,706,643

GRILL MEANS

William H. Tyson, Rte. 8, Box 53, Greenville, N.C. 27834

Continuation-in-part of Ser. No. 744,955, Jun. 17, 1985, Pat. No. 4,638,787. This application Dec. 4, 1986, Ser. No. 937,921
Int. Cl.[4] A47J *37/00*
U.S. Cl. 126—25 R **6 Claims**



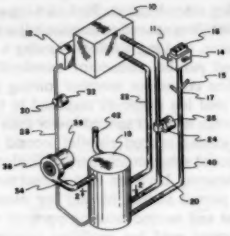
1. A convertible improved charcoal ignition to gas grill means comprising: an ignition chamber having a bottom, a surrounding wall structure extending upwardly from said bottom, and an open top wherein said surrounding wall structure slopes inwardly from said bottom to said open top; a grill chamber having a surrounding wall structure, an open bottom and an open top wherein said surrounding wall structure slopes outwardly from said open bottom to said open top; a collar extending between said open top of said ignition chamber and said open bottom of said grill chamber for supporting said grill chamber above said ignition chamber and for providing means for air to flow between said ignition chamber and grill chamber; basket type means disposed within said grill chamber for receiving and containing briquettes directly above said open bottom; means for supporting said basket type means within said grill chamber; a generally horizontal grill disposed within said grill chamber above said basket type means; means for supporting said grill with said grill chamber; a smoke cover movable between an open and closed position for closing said open top of said grill chamber; and a removable gas burner means; a removable ash pan; said gas burner means and such ash pan alternately insertable into said collar whereby a convertible grilling means is provided.

4,706,644

ENGINE HEATER

Gary T. Nakai, 5515 Cromwell La., Apt. G-3, Oak Forest, Ill. 60452

Filed Nov. 12, 1985, Ser. No. 797,392
Int. Cl.[4] F24D 9/00
U.S. Cl. 126—101 **13 Claims**



1. A heater comprising:
(a) a combustion chamber;
(b) a burner in said combustion chamber;
(c) a plurality of spaced gas conduits from said combustion chamber defining air passages therebetween;
(d) a liquid jacket having a liquid inlet and outlet;
(e) a multiplicity of spaced apart air conduits through said liquid jacket; and
(f) means for directing air through said air passages and then through said air conduit.

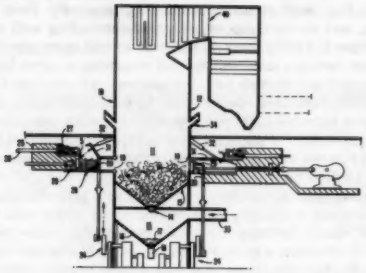
8. A method for starting a heating apparatus having a fuel burner, a liquid circulation system including a liquid pump, a burner igniter, an air blower, a fuel pump and a burner flame sensor, comprising the sequential steps of:
(a) circulating liquid through the heater;
(b) activating the burner igniter;
(c) blowing air into the heater and to the burner;
(d) pumping fuel to the burner;
(e) sensing for a flame at the burner; and
(f) deactivating the burner igniter when a flame is sensed at the burner.

4,706,645

METHOD AND SYSTEM TO PROVIDE THERMAL POWER FOR A POWER PLANT

L. David Ostlie, 19540 Patrick Pl., Corcoran, Minn. 55340

Filed Dec. 20, 1985, Ser. No. 811,413
Int. Cl.[4] F24H 3/02
U.S. Cl. 126—810 R **37 Claims**



1. A method for providing thermal power to generate electricity in a power plant comprising:
delivering substantially uncut and untrimmed whole trees into a combustion chamber;
burning said substantially whole trees in said combustion chamber to generate heat; and
absorbing the heat of combustion of said trees in a device for providing power to an electrical power generator.

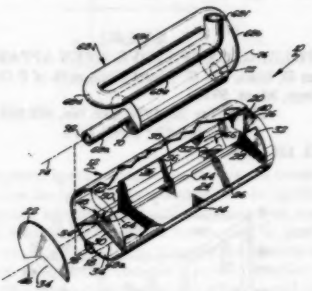
18. A system for providing power to an electrical generating power plant comprising:
means for defining a combustion chamber within which substantially uncut and untrimmed whole trees are received for burning;
conveyor means for delivering said substantially whole trees for combustion into said combustion chamber; and
heat absorbing means for absorbing the heat of combustion of said substantially whole trees, said heat absorbing means being adapted to be operatively connected to means for converting the absorbed heat into electrical power.

4,706,646

TOTAL COUNTERFLOW HEAT EXCHANGER

Paul O. Christianson, Glenburn, and James M. McDonald, Minot, both of N. Dak., assignors to M.A.C., Inc., Glenburn, N. Dak.

Filed Mar. 27, 1986, Ser. No. 844,850
Int. Cl.[4] F24H 3/12
U.S. Cl. 126—117 **30 Claims**



1. A total counterflow heat exchanger comprising:
a shell of generally cylindrical shape open at a first end and a second end, said shell having a surface and defining a three dimensional interior chamber having a generally cylindrical periphery, with said shell further defining a first portal and a second portal extending through said surface of said shell;
a first end cap at the first end of the interior chamber, said first end cap extending substantially radially inward from the periphery of the interior chamber generally perpendicular to the surface of the cylindrical portion of the shell and connected thereto;
a second end cap at the second end of the interior chamber opposing the first end cap, said second end cap extending substantially radially inward from the periphery of the interior chamber generally perpendicular to the surface of the cylindrical portion of the shell and connected thereto, the second end cap defining a duct portal extending through the surface of the second end cap;
a first partition having a first end edge, an opposing second end edge, and an outer longitudinal edge, said first partition extending substantially radially inward from the shell and connected thereto along said outer longitudinal edge of said first partition, and extending substantially perpendicular to the first end cap and connected thereto along said first end edge of said first partition adjacent the first portal, said first partition extending longitudinally through the interior chamber and connected to the second

end cap along said opposing second end edge of said first partition;

a second partition having a first end edge, an opposing second end edge, an outer longitudinal edge, and an opposing inner longitudinal edge, said second partition extending substantially radially inward from the shell and connected thereto along said outer longitudinal edge of said second partition, and extending substantially perpendicular to the first end cap and connected thereto along said first end edge of said second partition adjacent the first portal, said inner longitudinal edge of said second partition connected to a coextensive and coterminous segment of the first partition, said second partition extending longitudinally through the interior chamber and terminating therein, with the first and second partitions, the shell, the second end cap, and the first portal encompassing a first subchamber and a first passage;

a third partition having a first end edge, an opposing second end edge, an outer longitudinal edge and an opposing inner longitudinal edge, said third partition extending substantially radially inward from the shell and connected thereto along said outer longitudinal edge of said third partition and extending substantially perpendicular to the second end cap and connected thereto along said first end edge of said third partition, said inner longitudinal edge of said third partition connected to a coextensive and coterminous segment of the first partition, said third partition extending longitudinally through the interior chamber and terminating therein, with the second and third partitions, the shell, and the first and second end caps encompassing a second subchamber and a second passage, and with the third and first partitions, the shell, the second portal, the first and second end caps, and the duct portal encompassing a third subchamber, the subchambers and passages situated in fluid communication to form a serpentine channel; and

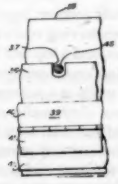
a serpentine tube spatially situated within and extending through the serpentine channel, said serpentine tube connected in fluid communication with said duct portal, and said serpentine tube having at least one elongated segment extending within each of the subchambers, whereby a primary fluid at a first temperature may be passed through the serpentine channel and a secondary fluid at a second temperature may be passed through the serpentine tube, thereby creating a temperature differential gradient with the temperature of each fluid approaching thermal equilibrium across the gradient as the fluids are passed through the heat exchanger.

4,706,647

AIR FLOW CONTROL FOR TOTALLY ENCLOSED FIREPLACE

Donald W. Wilkening, Akeley, Minn. 56433

Filed May 14, 1986, Ser. No. 862,983
Int. Cl.[4] F24C *15/10*
U.S. Cl. 126—140 **5 Claims**



1. In combination with a fireplace;

An openable sealing enclosure disposed over the front of a fireplace and having a plurality of horizontally spaced apart apertures disposed across the lower end and underneath the openable portion thereof; and

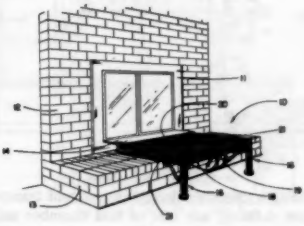
a continuous, moveable air control vane sealably, hingeably attached to the inside of said enclosure adjacent the lower end of said apertures and rotatable horizontally about said hinge between a closed position adjacent the inside edges of said apertures and an open position extending angularly, upwardly and rearwardly of said apertures whereby air flowing through said apertures will predominantly flow upwardly along the rear of said enclosure when said air control is adjacent said apertures near said closed position.

4,706,648

ASH CATCHER FOR FIREPLACE INSERT

Emmitt Blount, 103 South St.; Edward L. Exum, 202 Phillips St., and Murthis E. Wooten, P.O. Box 105, all of LaGrange, N.C. 28551

Filed Sep. 2, 1986, Ser. No. 902,794
Int. Cl.[4] F23J *1/00*
U.S. Cl. 126—243 **9 Claims**



1. An ash catcher for use in connection with a woodstove adapted to be inserted into a fireplace, said fireplace having a raised hearth, said woodstove having an outwardly extending ledge defining an open space between said ledge and the top of said hearth, comprising: an open top pan including a bottom and a surrounding wall structure, said surrounding wall structure having a rear wall, a front wall and side walls connecting opposite ends of said front and rear walls; hearth engaging means for supporting the rear portion of said pan on said hearth such that said rear wall extends into said open space between said ledge and said hearth; a pair of legs for supporting the front portion of said pan; at least one rear leg pivotally secured to said pan and movable between a retracted position in which said rear leg is folded against the underside of said pan when said pan is in engagement with said hearth and a downward, substantially vertical position for supporting the rear portion of said pan when said pan is not in engagement with said hearth; and means for biasing said rear leg to said downward position such that when said pan is removed from said hearth said rear leg automatically assumes a downward position.

4,706,649

SELECTIVELY SWITCHED SHADING FOR DAYLIGHTING AND THE LIKE

I. Vincent Hager, c/o East Coast Developments, Ltd., P.O. Box 5845, Hilton Head Island, S.C. 29928

Filed Sep. 16, 1985, Ser. No. 776,606
Int. Cl.[4] F24J *3/02*
U.S. Cl. 126—419 **2 Claims**

1. In combination with a building, a system for supplying daylight to an interior portion of said building including rooms located at a significant distance from exterior windows of said building, said system comprising:

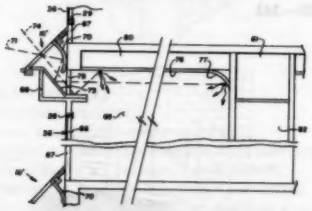
a first component having a generally planar configuration and disposed at an angle between an upper story portion and a wall portion of said building on a side thereof which receives sunlight;

a parabolic reflector operatively mounted behind said first component relative to the origin of the sunlight for receiving and reflecting sunlight having a low trajectory which passes through said first component;

flat light reflecting means disposed in operative association with said parabolic reflector and said first component to reflect light from said parabolic reflector, and sunlight having a high trajectory which passes through said first component, into an interior portion of said building; and

further reflective surfaces disposed within said building and mounted with respect to said flat reflecting means for dispersing and diffusing light reflected by said flat reflecting means into interior portions of said building, including at least one room, remote from exterior windows;

wherein said first component is a unitary structure comprising: frame means, including perimeter frame portions



defining a chamber therebetween, and transparent panel means defining one side of said chamber and extending between said perimeter frame means; a pair of spaced rollers rotatable about generally parallel axes of rotation and mounted to said frame means; a sheet of material coupled at each end thereof to one of said rollers, respectively, and extending therebetween and having at least two distinct portions, each of said distinct portions having substantially the same width and height as said chamber and having different light transmission properties for affecting at least one of the amount and the wave length of light which passes therethrough after first passing through said transparent panel means; and means for effecting rotation of said rollers to control which of said distinct portions of said sheet is disposed in operative association with said transparent panel means at any one time.

4,706,650

SOLAR COLLECTOR ASSEMBLY AND KIT

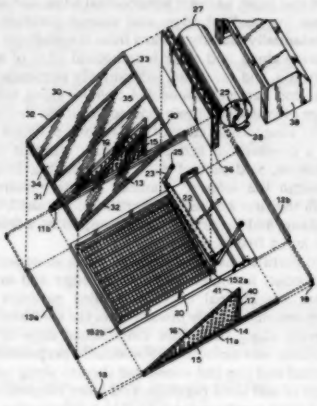
Randy L. Matzkanin, Coral Gables, Fla., assignor to Alternative Energy Resources, El Paso, Tex.

Continuation-in-part of Ser. No. 738,354, May 28, 1985, Pat. No. 4,622,951. This application Jul. 25, 1986, Ser. No. 890,719

Int. Cl.[4] F24J *2/56*

U.S. Cl. 126—450 **37 Claims**

1. A solar collector water heater assembly comprising a rectangular insulation board serving as a base; a solar absorber plate mounted on the insulation board and including a heat exchanger with couplings for connection to a tank; a water tank having main water inlet and outlet means and means connected to the couplings of the heat exchanger; a main frame assembled onto the insulation board about the solar absorber plate including a front rail, a rear rail, side rails and cornerkeys joining adjacent ones of the rails at their ends to form corners of the frame; a tank bed attached within the frame and mounting the tank; and at least one glazing panel having a top surface including a pair of legs inwardly disposed therefrom and a sheet of transparent material stretched onto the glazing panel; one of the legs being insertably received and retained by a first depression formed in one of the rail members; another of the legs being insertably received and retained by a second depression formed in a glazing rim; and the top surface of one of the glazing panels being cooperatively retained adjacent to one of the rail members by a side cap and also retained adjacent to the



glazing rim by an upper cap so that the glazing panel is securely retained within the assembly.

4,706,651

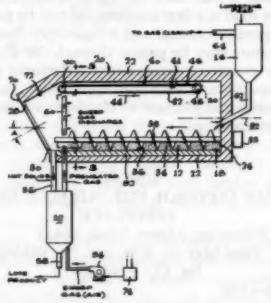
SOLAR SOLIDS REACTOR

Bernard D. Yudow, Chicago, Ill., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Feb. 24, 1986, Ser. No. 832,617

Int. Cl.[4] F24J *2/00*

U.S. Cl. 126—451 **20 Claims**



1. A solar powered solids reactor, comprising:

walls forming a chamber having rearward and forward end portions, side portions, and a top and bottom, said forward end portion being at an angle with respect to vertical;

means supporting said walls in a substantially fixed position so the chamber cannot continually rotate;

means for feeding solid material which is to be thermally reacted into said rearward end portion of said chamber;

means coupled to said forward end portion of said chamber for receiving solid material after it has been at least partially reacted in said chamber

said chamber walls having a aperture which passes solar radiation into said forward end portion of said chamber;

means for directing concentrated solar radiation through said aperture onto at least the top of said chamber;

means located in said top of said chamber for receiving said

solar radiation and for directing heat created by said solar radiation towards the bottom of said chamber; and

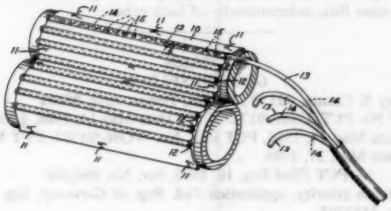
linear conveyor means located adjacent the bottom of said chamber for moving material received at said rearward end portion of said chamber, in a layer, along the bottom of the chamber to said forward end portion, while maintaining a top of the layer exposed to receive said heat created by said solar radiation.

4,706,652

TEMPORARY RADIATION THERAPY

Bruce S. Horowitz, Farmington Hills, Mich., assignor to Henry Ford Hospital, Mich.

Filed Dec. 30, 1985, Ser. No. 814,302
Int. Cl.[4] A61N *5/12*; A61M *37/04*
U.S. Cl. 128—1.2 **5 Claims**



1. A carrier for temporary radiation therapy comprising

a flexible sheet of a material absorbable by the human body, said sheet having a plurality of generally parallel passages therein,

a catheter extending into each said passage,

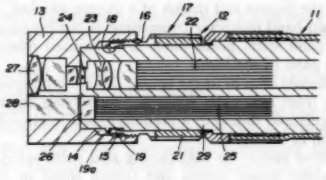
a tube containing longitudinally spaced radioactive seeds extending into each said catheter.

4,706,653

ENDOSCOPE DEVICE

Tsutomu Yamamoto, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jul. 29, 1986, Ser. No. 890,223
Claims priority, application Japan, Aug. 26, 1985, 60-130693
Int. Cl.[4] A61B *1/00*
U.S. Cl. 128—4 **4 Claims**



1. An endoscope device removably fitted with an attachment in a tip portion of an endoscope inserting portion, characterized by comprising:

an attachment having in the rear part a recess in which the tip portion of an endoscope inserting portion is engaged, having a female screw provided on the inner peripheral wall of this recess and removably connected and fixed to the tip portion of the endoscope inserting portion;

a connecting member rotatably and nonremovably fitted to the outer periphery of the tip portion of the endoscope inserting portion, having on the outer periphery a male screw screwed with the female screw of the attachment and pulling in and fixing the attachment;

a groove which is peripherally formed on the outer periphery of the tip portion of the endoscope inserting portion and in which the tip side of this connecting member will be positioned when the connecting member is fitted; and

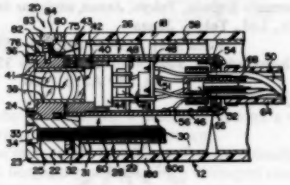
a plurality of engaging members provided to extend on the tip side of the connecting member, having an elastic deformability returning in a diameter contracting direction and engaged in the peripheral groove formed on the outer periphery of the tip portion of the endoscope inserting portion to prevent the connecting portion from being pulled out.

4,706,654

ENDOSCOPE HAVING INTERNAL PRESSURE COMMUNICATION MEANS

Hisao Ogiu, and Haruhiko Kaiya, both of Tokyo, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Aug. 5, 1986, Ser. No. 893,235
Claims priority, application Japan, Aug. 16, 1985, 60-180218; Dec. 6, 1985, 60-188080[U]
Int. Cl.[4] A61B *1/00*
U.S. Cl. 128—4 **10 Claims**



1. An endoscope comprising:

an operation section;

an insertion section extending from said operation section, for insertion in a body cavity, said insertion section being provided with a distal end assembly arranged at an extending end thereof;

a universal cord extending from said operation section;

a connector mounted at an extending end of said universal cord; and

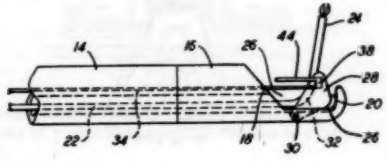
an image-pickup unit arranged in the extended end portion of said insertion section, said image-pickup unit having an objective optical system for forming an optical image, a sc'id-state image-pickup device for picking up the optical image formed by said objective optical system, and a case accommodating said objective optical system and said image-pickup device, said case being provided with a communication portion for causing the interior of said endoscope to communicate with the interior of said case.

4,706,655

SHIELD FOR ENDOSCOPE ELEVATOR CABLE SEAL

Allan I. Krauter, Syracuse, N.Y., assignor to Welch Allyn, Inc., Skaneateles Falls, N.Y.

Filed Aug. 26, 1986, Ser. No. 900,460
Int. Cl.[4] A61B *1/00*
U.S. Cl. 128—4 **6 Claims**



1. In an endoscope of the type employed for examination of

a patient's body cavity, comprising a flexible tubular member, a viewing head at the distal end of said tubular member, including imaging means in said head for viewing to the side of said head, a biopsy channel within said tubular member and extending to the distal end thereof and exiting through said head, in which channel an elongated flexible instrument can be inserted to pass through said head into the body cavity, an elevator block rotatably mounted on said head for diverting said flexible instrument emerging from said channel to the side of said head generally in the viewing direction of said imaging means, a control cable for said elevator block extending through said flexible tubular member and through a wall of said head for selectively pivoting the elevator block, and pivot means rotatably mounted on said block and affixed into the distal end of said control cable; the improvement further including an elongated shield mounted on said pivot means and spaced from said control cable in the direction of emergence of said flexible instrument, and extending proximally and generally parallel to said cable.

4,706,656

ENDOSCOPE DEVICE WITH TOOL CHANNEL

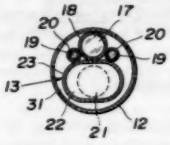
Tetsumaru Kuboto, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed May 5, 1986, Ser. No. 859,591

Claims priority, application Japan, May 15, 1985, 60-103442

Int. Cl.[4] A61B *1/06*

U.S. Cl. 128—6 **3 Claims**



1. An endoscope device characterized in that an observing optical systems, illuminating optical system and treatment tool channel are incorporated into respectively independent pipes which are then arranged to form an endoscope inserting part, said treatment tool channel pipe being formed in a noncircular cross-section and having a hollow gap extending axially along the interior of said treatment tool channel pipe between the treating tool and said treatment tool channel pipe when the treatment tool is inserted therethrough.

4,706,657

LIGHT QUANTITY ADJUSTER FOR ENDOSCOPE APPARATUS

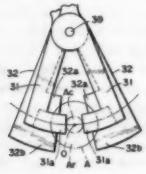
Kunihiko Miyagi, Tokyo, Japan, assignor to Kabushiki Kaisha Machida Seisakusho, Tokyo, Japan

Filed Jul. 8, 1986, Ser. No. 883,107

Claims priority, application Japan, Jul. 19, 1985, 60-109612[U]

Int. Cl.[4] A61B *1/06*

U.S. Cl. 128—6 **20 Claims**



1. An endoscope apparatus comprising:

light source means;

an endoscope including an inserting portion having window means located at a predetermined position of said inserting portion, and optical means for transmitting an illuminating light from said light source means to said window means, said optical means having one end thereof supplied with the illuminating light from said light soruce means and the other end allowing the illuminating light to be irradiated from said window means;

the illuminating light from said light source means having a luminous flux imaginarily divided in cross-section into at least two regions including central and peripheral reions; and

means for adjusting a light quantity of the illuminating light supplied to said one end of said optical means through said central region of said luminous flux and a light quantity of the illuminating light supplied to said one end of said optical means through said peripheral region of said luminous flux, independently of each other.

4,706,658

GLOVED SPLINT

Penny S. Cronin, 421 W. Lajolla, Tempe, Ariz. 85282

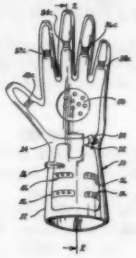
PCT No. PCT/US85/01723, § 371 Date May 14, 1986, § 102(e) Date May 14, 1986, PCT Pub. No. WO86/01707, PCT Pub. Date Mar. 27, 1986

PCT Filed Sep. 10, 1985, Ser. No. 866,608

Claims priority, application Fed. Rep. of Germany, Sep. 14, 1984, 3433795

Int. Cl.[4] A61F *5/04, 5/10*

U.S. Cl. 128—77 **23 Claims**



1. A hand protector for supporting and protecting selected ones of the fingers and thumb of a disease stricken or injured hand, said hand protector comprising in combination:

(a) a palm splint positionable in juxtaposed relationship to the palm of the hand;

(b) selected ones of finger splints and a thumb splint extending from said palm splint for supporting the respective fingers and thumb in a predetermined relationship to the palm of the hand;

(c) glove means for maintaining said palm splint and said selected finger splints and thumb splint in juxtaposed relationship with the corresponding parts of the hand, said glove means including;

i. a first envelope for holding fluid in juxtaposed relationship with at least a portion of the parts of the hand supported by said palm splint, and the selected ones of said finger splints and said thumb splint;

ii. a wrist portion for engaging the wrist and a part of the forearm of a user;

iii. a second envelope developed within said wrist portion for holding fluid;

iv. means for interconnecting said first and second envelopes to accommodate flow of fluid therebetween;

v. means for exposing and for maintaining exposed the tips of the respective supported ones of the fingers and thumb; and

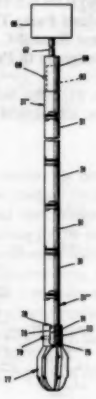
vi. means for discouraging application of pressure by any fluid within said second envelope of said glove means against the under side of the wrist.

4,706,659

FLEXIBLE CONNECTING SHAFT FOR INTRAMEDULLARY REAMER

Larry S. Matthews, and Steven A. Goldstein, both of Ann Arbor, Mich., assignors to Regents of the University of Michigan, Ann Arbor, Mich.

Filed Dec. 5, 1984, Ser. No. 678,682
Int. Cl.[4] A61F *5/04*
U.S. Cl. 128—92 VD 4 Claims



1. A flexible connecting shaft for an intramedullary canal reamer, comprising:

(a) first link means including first connection means for connecting said first link means to drive means;

(b) second link means including second connection means for connecting said second link means to reamer head means; and

(c) further link means interconnecting said first and second link means and including:

(1) a male end adapted to interfit with a female end formed on one of said first link means and said second link means;

(2) a female end adapted to interfit with a male end formed on the other of said first link means and said second link means;

(3) said shaft including fastening means for preventing disconnection of said link means;

(d) said shaft having a longitudinal axis and said link means interacting through structure allowing flexing of said shaft about said axis while substantially preventing relative twisting of any one link means with respect to any other link means, whereby said shaft may directly transmit torque from said drive means to said reamer head means substantially without slippage while said shaft conforms to the specific shape of the canal; said structure including:

(1) each said female end including a slot extending substantially perpendicular to said axis and having a narrowed opening;

(2) each said male end including a protruding member substantially corresponding, in shape, to the shape of said slot but of slightly smaller volume;

(3) said protruding member being insertable into a respective slot in a direction substantially perpendicular to said axis and being constrained from removal axially by said narrowed opening; and

(e) further wherein said fastening means comprises:

(1) each link means including a longitudinal passageway therethrough; and

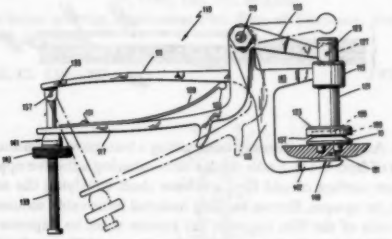
(2) flexible rod means extending through the passageways in all said link means.

4,706,660

PATELLAR CLAMP

Thomas D. Petersen, 5555 Reservoir Dr., San Diego, Calif. 92120

Division of Ser. No. 739,153, May 30, 1985, Pat. No. 4,633,862.
This application Apr. 29, 1986, Ser. No. 857,194
Int. Cl.[4] A61F *5/04*
U.S. Cl. 128—92 VW 6 Claims



1. A patellar clamp for installing a patella button on a resected posterior surface of a patella, comprising:

(a) a body portion including a first handle fixedly extending therefrom, said body portion including a C-shaped structure having a bottom surface and a top opening;

(b) said bottom surface having a convex surface with a fixation spike extending upwardly therefrom substantially centrally located thereon;

(c) said top opening comprising one end of a linear bore through said body portion which is substantially coaxial with said fixation spike;

(d) a second handle pivotably mounted to said body portion;

(e) a plunger extending through said bore and including a first end facing said fixation spike and a second end with a slot receiving a distal end of said second handle;

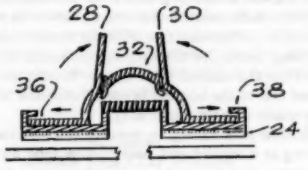
(f) whereby pivotal movement of said second handle with respect to said first handle causes linear reciprocation of said plunger in said bore.

4,706,661

WOUND CLOSURE AND OBSERVATION DEVICE HAVING A NO-CONTACT PROTECTIVE COVERING

David M. Barrett, P.O. Box 1693, Oklahoma City, Okla. 73101

Filed Oct. 31, 1986, Ser. No. 925,783
Int. Cl.[4] A61F *13/00*
U.S. Cl. 128—155 11 Claims



1. A wound closing protective device, comprising:

a plurality or planar pads normally disposed in a common plane,

each planar pad having a coating of adhesive material on one surface;

resilient means secured to confronting edges of said pads for drawing said pads toward each other; and, manually operated control means remote from and a depending portion contactably overlying the several pads for moving the pads in diverging directions.

4,706,662

FILM DRESSING WITH FABRIC BACKING

Darrell R. Thompson, Somerville, N.J., assignor to Johnson & Johnson Products, Inc., New Brunswick, N.J.

Filed Dec. 11, 1981, Ser. No. 329,968
Int. Cl.[4] A61L *15/00*
U.S. Cl. 128—155 7 Claims

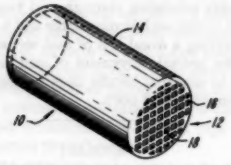
1. An adhesive dressing comprising a transparent continuous film of from 0.5 to 6 mils thick a skin-adhering adhesive applied to one surface of said film, a release sheet overlying the adhesive, an opaque, fibrous backing material removably secured to the side of the film opposite the release sheet to improve the handling characteristics of said dressing, said fibrous backing having the same outside dimensions as said film and being capable of being readily removed from said film without removing the film from the skin of a patient.

4,706,663

PARTICLE CATCHER FOR INHALATION DEVICES

Paul A. Makiej, 70 Mount Hope, Lowell, Mass. 01852

Filed Apr. 25, 1986, Ser. No. 856,047
Int. Cl.[4] B05B *1/26*
U.S. Cl. 128—200.18 8 Claims



1. A particle catcher for preventing particles, droplets and agglomerations of particles and droplets of a selected size in an aerosolized medicinal discharge of an inhalation device from passing from the inhalation device to the respiratory tract of a user, the inhalation device including a housing having a first end with an opening adapted to receive a canister containing a medicine that is dischargeable from the canister in an aerosolized form and a second end with a portion thereof defining an opening in communication with the outside, the housing also including means for discharging the medicine in aerosolized form from the canister towards the through the opening in the second end of the housing in communication with the outside, the particle catcher comprising:

a hollow tube having an opening at a first end and an opening at a second end, said hollow tube having means for removably mounting said first end in a tight-fitting relationship with the housing so that said hollow tube and the opening in the second end of the housing are in fluid communication; and

a screen having a plurality of apertures with each of said apertures being smaller in size than the particles, droplets and agglomeration of particles and droplets of a selected size, said screen being supported by said second end of said hollow tube across said opening at said second end;

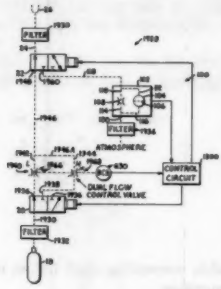
whereby when the aerosolized medicine is discharged from the inhalation device through the opening in the second end of the housing the aerosolized medicine passes through said hollow tube until the aerosolized medicine communicates with and passes through said screen with said screen preventing the particles, droplets and agglomerations of particles and droplets of a selected size from passing therethrough.

4,706,664

INSPIRATION OXYGEN SAVER

James A. Snook, Overland Park; Thomas W. Nelson, Lenexa; Marilyn S. Wyble, and Russell L. Trimble, both of Overland Park, all of Kans., assignors to Puritan-Bennett Corporation, Lenexa, Kans.

Filed Apr. 11, 1986, Ser. No. 851,132
Int. Cl.[4] A61M *16/00*
U.S. Cl. 128—204.23 16 Claims



1. Apparatus adapted for connection between a source of medicinal gas and a patient-coupled gas delivery device for supplying pulse volumes of medicinal gas from time to time during the patient's breathing cycles, said apparatus comprising:

selectively actuatable valve means adapted for operable coupling between said gas source and device for selectively establishing and interrupting gas flow communication therebetween; and

means operably coupled with said valve means for selectively actuating the same including

breathing cycle sensing and measuring means for tracking the patient's breathing efforts over plural breathing cycles, and for measuring a variable magnitude parameter incident to at least one reference breathing cycle, said variable magnitude parameter being at least partially predictive of the volume of said gas required by said patient during a medicinal gas-supplemented breathing cycle;

means operably coupled with said sensing and measuring means for determining a variable magnitude value correlated with said measured parameter and representative of said required volume of medicinal gas; and

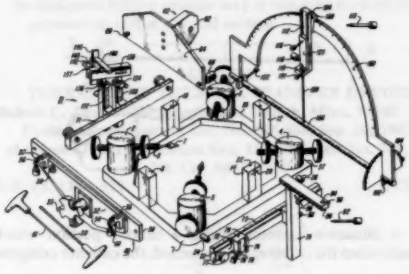
means coupling said value-determining means and said valve means for opening said valve means during said medicinal gas-supplemented breathing cycle for delivering to said patient said required volume of medicinal gas, said volume being variable in response to the magnitude of said determined value for supplying to said patient variable volumes of said gas during different gas-supplemented breathing cycles.

4,706,665

FRAME FOR STEREOTACTIC SURGERY

Kasim I. Gouda, 22 Baltimore St., Millis, Mass. 02054

Filed Dec. 17, 1984, Ser. No. 682,618
Int. Cl.[4] A61B 17/00
U.S. Cl. 128—303 B 28 Claims



1. In a stereotactic instrument for neurosurgery of the brain for use with a noninvasive scanner such as a CT scanner having a moveable table, said instrument having a rigid frame, means for attaching the frame to the patient's skull, means for determining scanner coordinates indicating a precise brain location from scanner measurements, means attached to said frame for defining a set of frame coordinates, and means attached to said frame for precisely guiding a surgical implement to said brain location in accordance with said scanner coordinates, the improvement comprising,

means for releasably fastening said frame to said CT scanner table, and

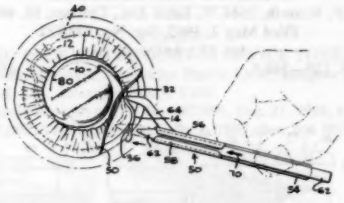
means for adjusting the plane of said frame to a predetermined position relative to the plane of said CT scanner table.

4,706,666

POSITIONING IMPLEMENT FOR INTRAOCULAR LENS

John H. Sheets, Rte. 5, Box 4801, Odessa, Tex. 79764

Filed Mar. 3, 1987, Ser. No. 21,318
Int. Cl.[4] A61B 17/00; A61F 2/16
U.S. Cl. 128—303 R 16 Claims



1. An implement for effecting the positioning in the posterior chamber of the eye of an intraocular lens of the type comprising a lens body and first and second haptics each having one end extending generally tangentially from the lens body and formed of a plurality of end-to-end sections which alternatingly have respective centers of curvature on opposite sides of the haptic so that the edge of each haptic comprises alternating protrusions and depressions, said implement comprising:

an elongated handle having a forward end and a pusher finger extending laterally and forwardly from said forward end and including a first pusher tip on the forward end of said pusher finger dimensioned and shaped as to be drivingly engageable with one of said haptics;

an elongated movable pusher mounted for axial reciprocation on said elongated handle portion and a second pusher tip on a forward-end of said movable pusher; and

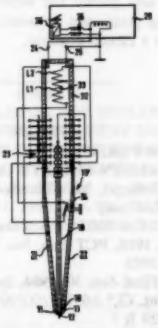
wherein said first pusher tip and said second pusher tip are laterally spaced apart a distance approximately equal the distance between two of said protrusions on one of said haptics.

4,706,667

ELECTRO SURGICAL HIGH FREQUENCY CUTTING INSTRUMENT

Eberhard Roos, Tuttlingen, Fed. Rep. of Germany, assignor to Berchtold Medizin-Elektronik GmbH & Co., Tuttlingen, Fed. Rep. of Germany

Division of Ser. No. 747,086, Jun. 20, 1985. This application Jul. 28, 1986, Ser. No. 892,883
Claims priority, application Fed. Rep. of Germany, Jun. 25, 1984, 3423356
Int. Cl.[4] A61B 17/36
U.S. Cl. 128—303.14 3 Claims



1. An electro-surgical apparatus for connecting to first and second outputs of an electrical generator comprising:

a first electrode comprising first and second generally elongate members, the members being spaced apart at one end and being displaceable relative to each other at the other end;

a second electrode disposed between the first and second members of the first electrode and beign generally parallel thereto;

means for displacing the second electrode relative to the first electrode;

means for connecting the first output of the electrical generator to the first and second members of the first electrode and for connecting the second output of the electrical generator to the second electrode when the second electrode is displaced to a first position relative to the first electrode; and

means for alternately connecting the first output of the electrical generator to the first member of the first electrode and for connecting the second output of the electrical generator to the second member of the first electrode when the second electrode is displaced to a second position relative to the first electrode.

4,706,668

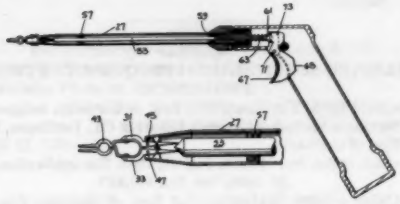
ANEURYSM CLIP PLIERS

Robert Backer, Cincinnati, Ohio, assignor to B & B Tools, Cincinnati, Ohio

Filed Sep. 16, 1985, Ser. No. 776,229
Int. Cl.[4] A61B 17/12
U.S. Cl. 128—325 7 Claims

1. An aneurysm clip pliers for applying an aneurysm clip to a blood vessel comprising: a hand grip portion; a barrel portion

having a first end connected to said hand grip portion and a second end including a Y-shaped grip for holding an aneurysm clip, said Y-shaped grip including two arms, each of said arms being pivotally connected to said barrel portion about its own



hinge pin; means connected to each of said arms to bias each of said arms open; and a pusher bar means inserted within said barrel portion, said pusher bar means having a tapered end capable of being positioned between said arms to cause said arms to pivot in a closed position.

4,706,669

DEVICE FOR PERFORATING THE LENS CAPSULE FRONT WALL IN THE EYE OF LIVING BEINGS

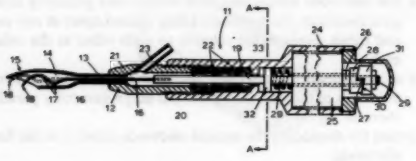
Hans-Joachim Schlegel, Max-Planck-Street 5, Bad Homburg, Fed. Rep. of Germany

PCT No. PCT/DE84/00024, § 371 Date Sep. 26, 1985, § 102(e) Date Sep. 26, 1985, PCT Pub. No. WO85/03217, PCT Pub. Date Aug. 1, 1985

PCT Filed Jan. 30, 1984, Ser. No. 783,934

Int. Cl.[4] A61F *9/00*; A61B *17/32*

U.S. Cl. 128—329 R **10 Claims**



1. Surgical instrument for perforating the front wall of the lens capsule in the eye of living beings for removing a piece of the capsule wall and producing an opening through which the lens capsule contents can be removed, comprising in combination

an elongated hollow handpiece,

an elongated tube disposed near a front end of said handpiece, having an opening near the front end of said handpiece, and at least partially fitting into said handpiece,

an elongated wire located in said tube, being movable between axially frontal and retracted positions, and having one pointed end extended in a frontal direction through the opening of said tube in said frontal position,

a drive motor connected to said wire, and

means associated with said drive motor for reciprocally moving said wire between said frontal and retracted positions so that said wire is moved relatively slowly from said frontal position to said retracted position, but is aburptly moved forwardly from said retracted position to said frontal position.

4,706,670

DILATATION CATHETER

Erik Andersen, Roskilde, and Gianni Leoni, Greve Str., both of Denmark, assignors to Meadox Surgimed A/S, Denmark

Filed Nov. 26, 1985, Ser. No. 801,715

Int. Cl.[4] A61M *29/02*

U.S. Cl. 128—344 **30 Claims**

1. A dilatation catheter having a balloon portion which expands when the catheter is pressurized, the catheter comprising:

a shaft of elastomeric material having a longitudinal axis, said elastomeric material reinforced with filaments which lie at an angle relative to the axis of the shaft, including a movable portion and a balloon portion,

the movable portion having filaments which lie at an angle which is greater than a predetermined critical angle relative to the axis of the shaft, the critical angle being the angle at which expansion of the shaft stops when pressurized internally, the movable portion increasing in length when the catheter is pressurized,

the balloon portion of the shaft being capable when internally pressurized of expansion in diameter to provide a balloon, the filaments of the balloon portion lying at an angle which is less than the critical angle, whereby, when the balloon portion is expanded under pressure, expansion of the balloon stops when the filaments lie at the critical angle,

the increase in length of the movable portion corresponding substantially to a decrease in length of the balloon portion when the catheter is pressurized so that the location of the balloon portion remains substantially at the position prior to expansion.

4,706,671

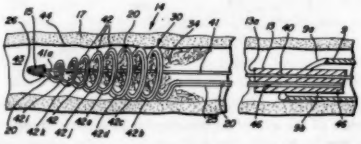
CATHETER WITH COILED TIP

Harry P. Weinrib, 2644 W. Estes Ave., Chicago, Ill. 60645

Filed May 2, 1985, Ser. No. 730,322

Int. Cl.[4] A61M *25/00*

U.S. Cl. 128—348.1 **16 Claims**



1. A catheter for insertion into a living vessel comprising:

an elongated tube formed of a flexible elastomeric material and having a proximal end and a distal end, an elongated wire member extending longitudinally within the tube from the proximal end of the tube to the distal end and providing rigidity to the catheter to aid in guiding insertion of the catheter into and through the living vessel,

a coil section on said catheter movable between a first insertion position and a second operative position, said coil section being extended to the insertion position by exten-

sion of the wire member to decrease the diameter of the coil portion for insertion into and through the living vessel;

said coil section being expanded in diameter and into the coiled operative position upon relaxation of the straightening force applied to the coil section by the wire member, and

an elongated hollow passage way in said tube to receive fluid pressure to stiffen the coil section.

4,706,672

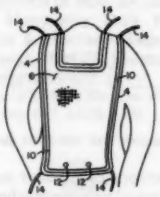
THERAPEUTIC THERMAL TRANSFER DEVICE

Robert C. Jones, 8427 Grand Ave., Duluth, Minn. 55808

Continuation-in-part of Ser. No. 536,366, Sep. 26, 1983, abandoned. This application Oct. 15, 1985, Ser. No. 789,300

Int. Cl.[4] A61F *7/00*

U.S. Cl. 128—379 **4 Claims**



1. A heat transfer garment comprising:

(a) an air permeable metallic meshwork constructed of a plurality of woven metal fibers, wherein ones of said fibers are of a first metal and others are of a second different type metal, wherein the peripheral edges of said meshwork are bound to prevent fraying and wherein said meshwork is of a generally rectangular shape and includes first and second spaced apart elongated portions extending outwardly from one edge thereof;

(b) an air permeable, thermally transmissive cloth envelope for removably containing said meshwork, said meshwork mounting therein at a resealable opening, and having a plurality of tie straps secured about the periphery thereof; and

(c) a plurality of mating fasteners secured about the surface of said cloth envelope whereby said tie straps and fasteners cooperatively secure said meshwork in thermal transfer relation to selected body parts.

4,706,673

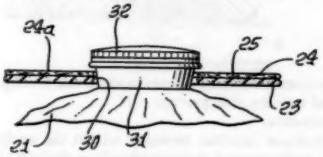
LIQUID PACK AND RETENTION DEVICE THEREFOR

William R. Meistrell, Manhattan Beach, Calif., assignor to Dive N'Surf, Inc., Hermosa Beach, Calif.

Continuation-in-part of Ser. No. 687,909, Dec. 31, 1984, Pat. No. 4,585,003. This application Dec. 2, 1985, Ser. No. 803,634

Int. Cl.[4] A61F *7/08, 7/10*

U.S. Cl. 128—402 **1 Claim**



1. A liquid pack retention device, and in combination with said pack which includes a flexible bag, the pack having a neck, comprising

(a) an elongated insulative, flat, flexible, relativly thin sheet that is everywhere bi-directionally stretchable, the sheet including a first elastomeric layer consisting of neoprene foam, and a second layer of pile fabric attached to and substantially covering one entire side of the first layer, and forming a composite therewith,

(b) the sheet having a portion forming a through opening receiving said pack neck, and said portion then substantially flatly engaging the pack extent about said neck, the opening surounded by pile fabric,

(c) the remainder of the sheet then adapted to adustably wrap, and to be tensioned, about a user's anatomy, with said pile fabric presented outwardly, there being tab means integral with and contacting said first elastomer layer at one end portion of the sheet, the tab means carrying hook elements projecting beyond said end portion of said sheet to be free for removably attaching to said second layer at any of a multiple of positions of wrap adjustment of the sheet, and proximate said pack neck.

4,706,674

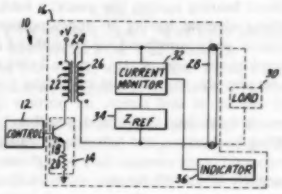
ELECTRICAL STIMULATOR FOR BIOLOGICAL TISSUE UTILIZING OUTPUT CURRENT MONITOR

Alan P. Dieken, St. Paul, and Joel R. Dufresne, Vadnais Heights, both of Minn., assignors to Minnesota Mining and Manufacturing Co., St. Paul, Minn.

Filed Jun. 17, 1985, Ser. No. 744,977

Int. Cl.[4] A61N *1/36*

U.S. Cl. 128—419 R **6 Claims**



1. A biological tissue stimulator, comprising:

control means for selecting and supplying electrical stimulus parameters;

drive circuit means coupled to said control means for supplying an electrical stimulus signal from said electrical stimulus parameters and adapted to stimulate biological tissue;

an electrode designed to be capable of passing said electrical signal to associated biological tissue;

said stimulator may optimally operate comprising said electrode, associated biological tissue and any electrode-tissue interfaces;

a transformer having a primary winding and a secondary winding, said primary winding being operatively coupled to said drive circuit means; said secondary winding being operatively coupled to said electrode;

a reference impedance having a value of at least 10 times the value of said design impedance;

a current monitor for detecting the flow of current through said reference impedance above a predetermined threshold value;

said reference impedance and said current monitor being coupled in series with each other and in parallel with said secondary winding and said electrode; and

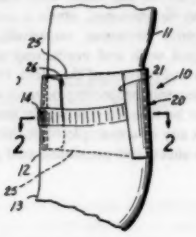
indicator means responsive to said current monitor for indicating if said predetermined threshold has been exceeded.

4,706,675

SUPPORT GARMENT FOR ENERGETIC ACTIVITIES

David L. Ekins, Calabasas, Calif., assignor to The Gold Belt Line, Inc., Reseda, Calif.

Filed Mar. 28, 1986, Ser. No. 845,643
Int. Cl.[4] A41C 1/00
U.S. Cl. 450—114 4 Claims



1. A garment to support and to cover portions of the body during energetic activities, said garment comprising:

a support for the back of the wearer, comprising a central, relatively rigid brace element so proportioned and shaped as to bear against and brace the lower region of the wearer's back, extending both above and below the wearer's waistline, and extending for a substantial length laterally from both sides of the wearer's spine, a pair of flexible straps attached to and extending laterally from said brace element, at least one of said straps being at least in part elastic, and joinder means to join said straps together when wrapped around the wearer's torso with said brace element bearing against the wearer's back;

a clothing element having an upper portion, a pair of leg portions, and a waistband, said waistband at least partially encircling the waist of said wearer, being attached to said brace element, and with its encircling portion free from and outside of said straps, no portion of said clothing element extending above said waistband, said straps extending both above and below said waistband;

whereby said brace element may be tightened in place independently of said waistband, and said clothing element is held against sliding off by virtue of its attachment to said brace element.

4,706,676

DERMAL SUBSTANCE COLLECTION DEVICE

Carl C. Peck, Rockville, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 11, 1985, Ser. No. 660,778
Int. Cl.[4] A61B 5/00
U.S. Cl. 128—632 21 Claims

1. A dermal substance collection device for the immediate and continuous collection of a dermal substance from a dermal surface, comprising

(a) a binding reservoir material for binding with said dermal substance to prevent back transfer loss of said dermal substance from said collection device to the dermal surface;

(b) a liquid bridge transfer medium which allows the instantaneous and continuous transfer of said dermal substance from the dermal surface to said binding reservoir material, said binding reservoir material being maintained in a wet-state by said liquid bridge transfer medium; and

(c) a cover means for occlusively containing said binding reservoir material and said liquid bridge transfer medium and for occlusively maintaining said liquid bridge transfer medium in continuous contact with the dermal surface upon application of said collection device to the dermal surface.

4,706,677

MULTIPLE SENSOR BUNDLE

Mark S. Goorsky, Niles; Mark B. Koch, Mt. Prospect, and Richard C. Murray, Jr., Palatine, all of Ill., assignors to Spectramed, Inc., Newport Beach, Calif.

Filed Sep. 23, 1985, Ser. No. 779,342
Int. Cl.[4] A61B 5/00
U.S. Cl. 128—634 6 Claims

1. A multiple sensor for insertion into an arterial cannula comprising:

a plurality of sensors, each sensor including a sensing element and an optical waveguide wherein said optical waveguide includes first and second waveguide pieces having ends in spaced relationship, said sensing element being disposed between said ends of said first and second waveguide pieces;

said sensors being bonded together by an adhesive such that said adhesive bonds said first waveguide pieces together and said second waveguide pieces together without said adhesive covering said sensors in a region containing said sensing elements and portions of said first and second waveguide pieces;

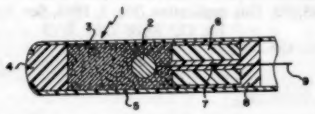
wherein said sensing elements are positioned from one another to maximize exposure to a sensing environment.

4,706,678

ELECTROCHEMICAL REFERENCE ELECTRODE

Josephus M. Otten, Miami, Fla., and Berend Boekema, Roden, Netherlands, assignors to Cordis Europa N.V., Roden, Netherlands

Continuation of Ser. No. 704,612, Feb. 22, 1985, abandoned. This application Mar. 2, 1987, Ser. No. 21,546
Claims priority, application Netherlands, Feb. 29, 1984, 8400649
Int. Cl.[4] G01N 27/36; A61B 5/00
U.S. Cl. 128—635 6 Claims



1. An electrochemical reference electrode having improved potential stability, comprising:

an enclosure;

an electrode member mounted within the enclosure, said electrode member being made of a metal and a salt of said metal in substantial equilibrium with each other, the cation of said metal being capable of participating in a reversible chemical reaction;

an electrolyte that is in contact with said electrode member, said electrolyte being an equilibrium maintaining component that is a liquid solution of a substantially constant composition and containing an anion which forms a sub-

stantially insoluble compound with said metal cation of the electrode member, said anion being the anion of said metal salt of the electrode member, said electrolyte having added thereto a soluble salt of said metal cation, which soluble salt is present within the electrolyte at a concentration that is sufficient to have said metal cation present within the electrolyte at its saturation concentration to thereby rapidly form said substantially insoluble compound in order to maintain same at it saturation concentration within the electrolyte and deposit same onto said electrode member in order to substantially maintain said equilibrium between said metal and said metal salt of the electrode; and

means for electrically connecting the electrode member to a system for measuring the ion concentration of a liquid.

4,706,679

DISPOSABLE MONITOR FOR AN EEG HEAD SET

Albert L. Schmidt, Murrysville; Gary W. Sherwin, South Huntington; Kenneth K. Blackham, Edgewood, and John L. Johnson, Plum Borough, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 27, 1986, Ser. No. 822,725

Int. Cl.[4] A61B *5/04*

U.S. Cl. 128—639 **5 Claims**

1. A disposable monitor, comprising:

a conductive tube; and

conductive wires contacting and extending from said tube for contacting a patient, said wires being silver and said tube being silver coated.

4,706,680

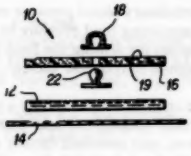
CONDUCTIVE ADHESIVE MEDICAL ELECTRODE ASSEMBLIES

Preston Keusch, New York, N.Y., and John L. Essmyer, Hasbrouck Heights, N.J., assignors to Nepera Inc., Harriman, N.Y.

Filed Jun. 30, 1986, Ser. No. 879,877

Int. Cl.[4] A61B *5/04*; A61N *1/04*

U.S. Cl. 128—640 **11 Claims**



1. In a medical electrode adapted for providing electrical contact with a patient's skin and comprising:

(a) a conductive member including means for connecting the medical electrode to an external electrical apparatus; and

(b) interfacing means comprising a solid sheet of a conductive viscolastic hydrophilic gel, connected electrially with the conductive member and having a face adapted for interfacing electrically with and adhesively to the patient's skin, which sheet is more cohesive than it is adhesive to the patient's skin and is mechanically connected more firmly to the conductive member than it can be adhesively affixed to the patient's skin, thereby enabling concurrent removal of the conductive member and the sheet from the skin after use without leaving a noticeable residue on the skin,

the improvement wherein the hydrophilic gel is a homogeneous aqueous mixture, substantially free of unbound water, monomers and cross-linking agents, consisting essentially of

(i) water;

(ii) an amount dissolved in the water of a water soluble electrolyte effective to reduce the transverse electrical resistance of the sheet to an impedence at 60 Hz of less than 1,000 ohms, and

(iii) an amount dispersed uniformly throughout the water of from about 2 to 35 wt % of a cross-linked polyethylene oxide, effective to form with the water a tacky surfaced viscoelastic solid,

which hydrophilic gel is produced by subjecting a liquid film of an aqueous solution, having a viscosity of about 2–2,000$\times 10^3$ cps, of the electrolyte and a linear water soluble polyethylene oxide having a weight average molecular weight from about 0.05–10$\times 10^6$ Daltons to an amount of high energy radiation effective to convert the liquid film to a sheet of the viscoelastic solid having an adhesive face which in the rolling ball tack test gives a rolling ball distance of less than about 10 mm and an adhesion energy force in the Adhesion Energy Density Determination Test of about 2 to 80 g-cm/cm^2 which adhesive sheets have greater cohesive strength than adhesive strength, whereby the sheet can be removed from a surface to which it is affixed without leaving a visible residue.

4,706,681

CARDIAC ULTRASONICALLY MARKED LEADS AND METHOD FOR USED SAME

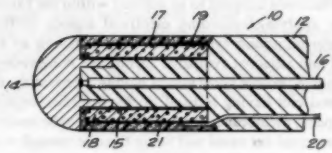
Branko Breyer; Ivo Cikes, and Bozidar Ferek-Petric, all of Zagreb, Yugoslavia, assignors to Telectronics N.V., Curacao, Netherlands

Filed Jun. 13, 1985, Ser. No. 744,375

Claims priority, application Yugoslavia, Jul. 26, 1984, 1328/84

Int. Cl.[4] A61B *5/04, 10/00*; A61N *1/05*

U.S. Cl. 128—642 **4 Claims**



1. A cardiac ultrasonically marked lead having a distal tip, said lead comprising:

an elongated plastic body;

a first electrical conductor;

an electrode positioned within said plastic body having an exposed electrically conductive surface at the distal tip of said lead and connected to said first electrical conductor, said first conductor leading to a first lead terminal;

a transducer contained within said plastic body and located adjacent to said electrode, said transducer having an inner and an outer conductive layer, one of said inner and outer layers being in electrical contact with said electrode to provide an electrical connection between said transducer and said electrode;

a second electrical conductor electrically connected to the

other of said inner and outer layers, said second conductor leading to a second lead terminal; and

an ultrasound matching layer which is electrically an insulator, surrounding said transducer, whereby

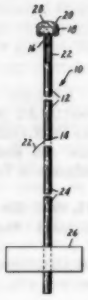
said transducer provides ultrasonic guidance of medical procedures and detection of breakage of said first electrical conductor and detection of breakage of said ultrasound matching layer.

4,706,682

EXTERNAL EAR CANAL ELECTRODE TO BE PLACED PROXIMATE THE TYMPANIC MEMBRANE

Paul H. Stypulkowski, North Oaks, and Christopher van den Honert, Maplewood, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 767,324, Aug. 21, 1985, abandoned.
This application Apr. 9, 1987, Ser. No. 36,209
Int. Cl.[4] A61B 5/04
U.S. Cl. 128—642 19 Claims



1. An electrode adapted to be utilized within the external ear canal for applying/recording electrical signals to/from the neural/neuromuscular system of a person having an external ear canal and adjacent tympanic membrane comprising:

an elongate flexible body means having a proximate end and a distal end having a distal tip for insertion adjacent the tympanic membrane, being stiff enough to be inserted into the external ear canal and being flexible enough to bend if said electrode is inserted against the tympanic membrane without rupturing the tympanic membrane;

a compressible material mounted at the top of said distal end of said body means;

an electrically conductive gel carried at said distal end of said body means by the distal tip of said compressible material; and

an electrical conductor extending along said body means, said electrical conductor being electrically coupled to said electrically conductive gel and adapted to be coupled to a stimulator/recorder at said proximate end of said body means;

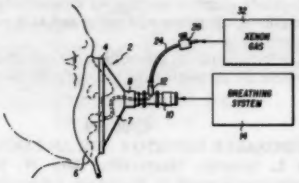
whereby said electrode may be placed in the external ear canal with said distal end being proximate the tympanic membrane or tympano-meatal annulus so that neural/-neuromuscular system may be electrically stimulated/-recorded.

4,706,683

METHOD AND APPARATUS FOR BOLUS DELIVERY OF GASES AND AEROSOLS AND INSUFFLATIONS

Henry Chilton, Louisville, N.C., and Lester Dickson, Budd Lake, N.J., assignors to Bowman Gray School of Medicine, Wake Forest University, Winston-Salem, N.C.

Filed Dec. 20, 1985, Ser. No. 811,814
Int. Cl.[4] A61B 6/00
U.S. Cl. 128—654 27 Claims



1. An apparatus for administering of a substance, comprising:

a face mask defining a cavity having a face opening shaped and sized to fit over at least the mouth of a patient to define a closed space, said face mask including seal means for sealing against a face of a patient;

conduit means for communicating said cavity with a respiratory gas volume; and

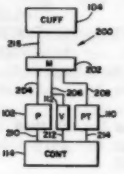
administration means in said cavity, said administration means having an open end positionable in said face mask such that said patient wearing said face mask can suck on said open end, said administration means including interfacing means for communicating said administration means with a source of a substance.

4,706,684

AMBULATORY BLOOD PRESSURE APPARATUS

Jay R. Sorensen, and Joseph D. LaPerna, both of Beaverton, Oreg., assignors to SpaceLabs, Inc., Bothell, Wash.

Filed Jun. 30, 1986, Ser. No. 880,250
Int. Cl.[4] A61B 5/02
U.S. Cl. 128—677 10 Claims



1. In an ambulatory blood pressure monitor including a cuff, a pump for increasing fluid pressure in the cuff and a pressure transducer means for sensing the fluid pressure in the cuff and generating signals in response thereto, the improvement comprising:

a manifold coupled to said cuff by a single fluid passageway, and further coupled to said pump, valve and pressure transducer, said manifold further comprising:

a main body having an interior region comprising a main chamber and a separate secondary chamber;

means for providing restricted fluid communication between said main chamber and said secondary chamber;

a first means for providing fluid communication between said main chamber and said pump separate from said restricted providing means;

a second means for providing fluid communication between said main chamber and said cuff separate from said restricted providing means; and

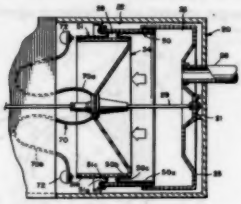
a third means for providing fluid communication between said secondary chamber and said pressure transducer means separate from said restricted providing means.

4,706,685

SPIROMETER WITH DOUBLE ROLLING SEALS

William C. Jones, Jr., and William C. Jones, both of 143 Briarwood North, Oak Brook, Ill. 60521

Filed Sep. 15, 1986, Ser. No. 907,318
Int. Cl.[4] A61B 5/08
U.S. Cl. 128—725 17 Claims



1. A spirometer for measuring breathing functions of human subjects, said spirometer having a cylindrical casing with rear and side walls defining a cylindrical chamber open at one end; a cylindrical piston supported for axial movement within said chamber; said piston being connected to indicating means for indicating the axial travel of said piston; port means in said rear wall for the entry and removal of expired air into and from said chamber behind said piston; and sealing means disposed between said piston and the inner surface of said casing; wherein the improvement comprises

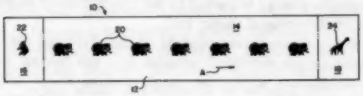
said sealing means being in the form of first and second annular membranes each formed of elastomeric material; said first membrane being reversely folded upon itself to provide an outer annular end portion sealingly secured to the inner side wall of said casing and an inner annular end portion sealingly secured to said piston adjacent the rear end thereof; said second membrane also being reversely folded upon itself to provide an outer annular end portion sealingly secured to the inner side wall of said casing and an inner annular end portion sealingly secured to said piston adjacent the front end thereof; said first and second membranes being arranged with their respective folds facing each other; said first membrane having the major portion of its axial length extending rearwardly behind said piston when said piston is at the forward limit of its stroke; and said second membrane having the major portion of its axial length extending forwardly beyond said piston when said piston is at the rearward limit of its stroke.

4,706,686

DIAGNOSTIC SCREENING PROCEDURE FOR IDENTIFYING DYSMETRIC DYSLEXIA

Harold N. Levinson, 600 Northern Blvd., Great Neck, N.Y. 11021

Filed Oct. 27, 1986, Ser. No. 923,598
Int. Cl.[4] A61B 5/00
U.S. Cl. 128—745 6 Claims



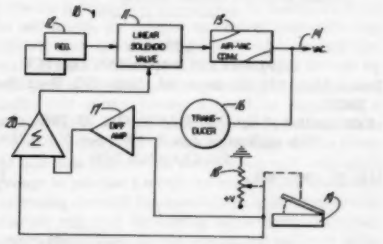
1. A diagnostic screening procedure for identifying those subjects possibly suffering from dysmetric dyslexia comprising the steps of providing a visual display consisting of a plurality of discrete objects moving in a continuous line between a pair of spaced stationary objects, permitting the subject to read the display from a distance at which normal subjects being screened are capable of seeing both stationary objects within their field of vision, and identifying those subjects failing to see the entire display as possibly being dyslexic which is based upon the discovery that dyslexics have a significantly smaller peripheral field of vision than persons not suffering from dysmetric dyslexia.

4,706,687

LINEAR SUCTION CONTROL SYSTEM

Wayne W. Rogers, Napa; Carl C.T. Wang, Piedmont, both of Calif., assignor to Alcon Instrumentation, Inc., Fort Worth, Tex.

Filed Feb. 28, 1985, Ser. No. 706,654
Int. Cl.[4] A61M 13/00
U.S. Cl. 128—752 20 Claims



1. A surgical suction control system for aspirating and cutting tissue comprising:

solenoid valve means for regulating the flow of pressurized fluid;

means for converting the pressurized fluid into a vacuum, which converting means is adapted to communicate with a device for aspirating and cutting tissue;

transducer means for sensing the vacuum and for generating a first signal in response thereto;

controller means for selecting an appropriate vacuum level for aspirating and cutting tissue and for generating a second signal which corresponds to said level;

comparator means for comparing the first and second signals and generating a third signal to drive the solenoid valve means to regulate the flow of pressurized fluid and the vacuum in order to regulate the aspirator and cutting of tissue.

4,706,688

NON-INVASIVE CARDIAC DEVICE

T. Anthony Don Michael, 2108 Truxtun Ave., Bakersfield, Calif. 93301, and Edward H. Lambert, 44 Gunton Drive, Lowestoft Suffolk, NR 32 4QB, United Kingdom

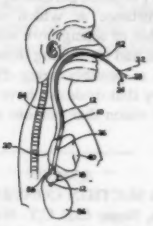
Continuation of Ser. No. 264,961, May 18, 1981, abandoned. This application Oct. 26, 1983, Ser. No. 545,535
Int. Cl.[4] A61B 1/04
U.S. Cl. 128—785 5 Claims

1. A non-invasive cardiac device which may be inserted through the esophagus and into the gastroesophageal junction region and a selected portion urged adjacent the cardiac region for internal stimulation, pacing, and monitoring, comprising:

an elongated conduit having a series of electrodes disposed thereon along its length so as to be adjacent the cardiac region when the device is in position in the esophagus;

first locating means for positioning said electrodes adjacent the cardiac region and a distal end of said device adjacent

said gastroesophageal region, said first locating means being joined to said conduit at the conduit distal end; and



second locating means for positioning said device in said esophagus joined to the conduit and extending outwardly therefrom with at least some of said electrodes in abutting contact with the cardiac region.

4,706,689

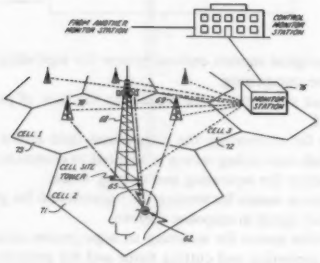
IMPLANTABLE HOMING DEVICE

Daniel Man, 851 Meadows Rd., Suite 222, Boca Raton, Fla. 33432

Continuation of Ser. No. 792,935, Oct. 30, 1985, abandoned. This application Jan. 8, 1987, Ser. No. 4,753

Int. Cl.[4] A61B *5/00*

U.S. Cl. 128—903 **16 Claims**



1. In an implantable homing device having a transmitter, and a source of power connected to apply operating current to said transmitter; the improvement wherein said source of power comprises oscillator means, a battery connected to energize said oscillator means, means applying the output of said oscillator means to said transmitter as a source of operating current therefor, whereby said transmitter is intermittently operated, said transmitter comprising an oscillator and a programmable signal generator connected to provide a programmable output coded signal for modulating said oscillator, and means responsive to the voltage of said battery for controlling said programmable generator, whereby the output of said transmitter is modulated as a function of the voltage of said battery.

4,706,690

CROP DIRECTOR FOR A ROTARY COMBINE

Michael L. Huhman, Kansas City, Mo., assignor to Deutz-Allis Corporation, Milwaukee, Wis.

Filed Dec. 4, 1986, Ser. No. 937,689

Int. Cl.[4] A01F *12/00, 29/10*

U.S. Cl. 130—27 P **3 Claims**

1. A combine having a crop processor including a foraminous cylindrical cage,

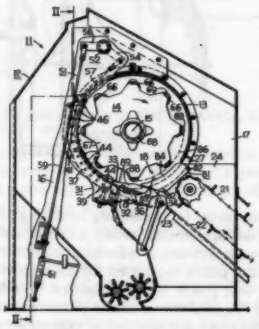
a radially open inlet in said cage,

a radial discharge opening in said cage spaced axially from said inlet,

a concave circumferentially aligned with said inlet and of the same axial width,

a crop feeder connected in crop delivery relation to said inlet,

a rotor rotatably mounted within said cage in generally coaxial relation to the latter having circumferentially spaced members presenting radially outward projecting crop engaging flanges extending diagonally in relation to the axis of said rotor whereby crop material delivered to said processor by said feeder is moved axially in said cage by said flanges toward said discharge opening,



said inlet having a circumferentially extending edge at the side thereof toward which the crop material entering the cage by way of said inlet is moved axially ty said flanges, and

a crop director secured to said combine at said circumferentially extending edge and including a portion extending radially inward into said cage from said edge and presenting an arcuate edge a predetermined radial distance from said flanges of said rotor, said crop director assisting in guiding incoming crop material entering said inlet across said concave in opposition to the axial movement effect of said flanges on said incoming crop material.

4,706,691

TOBACCO TREATING PROCESS

J. N. Jewell, Macon, Ga.; K. R. Korte, Louisville, Ky.; R. H. Marshall, New Albany, and Kevin A. Zipperle, Jeffersonville, both of Ind., assignors to Brown & Williamson Tobacco Corporation, Louisville, Ky.

Continuation-in-part of Ser. No. 482,756, Apr. 7, 1983, Pat. No. 4,582,070. This application Apr. 14, 1986, Ser. No. 851,751

Int. Cl.[4] A24B *3/18*

U.S. Cl. 131—300 **10 Claims**

1. A method of treating tobacco to produce a product for use in smoking articles comprising the steps of:

adjusting the moisture content of the tobacco to be shredded to a preselected percentage by weight;

shredding the tobacco in a disc shredder controlling the specific energy imparted to the tobacco being shredded to a predetermined value; and,

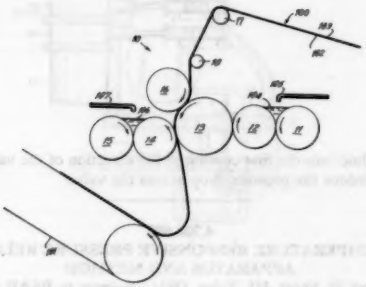
reducing the moisture content of the shredded tobacco by heating the shredded tobacco in a gas having an initial temperature within the range of from about 250° F. to about 650° F. in the presence of an absolute humidity at a level above that which will provide a wet-bulb temperature reading of at least 150° F.

4,706,692

METHOD AND APPARATUS FOR COATING RECONSTITUTED TOBACCO

Grant Gellatly, Chester, Va., assignor to Philip Morris Incorporated, New York, N.Y.

Filed Dec. 30, 1985, Ser. No. 814,393
Int. Cl.[4] A24B *3/14*
U.S. Cl. 131—370 6 Claims



1. Apparatus for applying slurries of coating material to both sides of a web of reconstituted tobacco, said apparatus comprising:

forward roll coating means for applying a first layer of slurry to one side of said web; and

reverse roll coating means adjacent said forward roll coating means for applying a second layer of slurry to the other side of said web; wherein

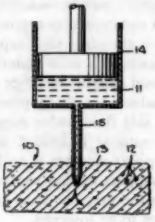
said web is continually supported by said forward roll coating means from the point at which it engages said forward roll coating means to the point at which it leaves said reverse roll coating means, said forward roll coating means adhering to said web, whereby said web is prevented from being torn by said reverse roll coater.

4,706,693

COSMETIC CREAM APPLICATOR

Donald Spector, 380 Mountain Rd., Union City, N.J. 07087

Filed Sep. 29, 1982, Ser. No. 427,193
Int. Cl.[4] A45D *40/00*
U.S. Cl. 132—79 R 6 Claims



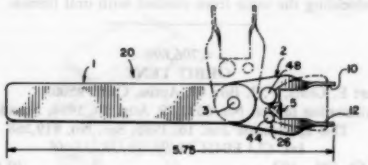
1. A disposable applicator for a skin moisturizer cosmetic cream which makes it possible to apply the cream to the skin of the user without finger contact with the skin, and to scrub the skin surface, said applicator comprising a relatively rough pad formed of flexible foam synthetic plastic material having open cells, the outer layer of the pad having partially closed pores, said pad having injected therein a metered amount of the cosmetic cream which impregnates the internal pores thereof but is not exuded from the outer layer unless the applicator is squeezed by the user, said outer layer reducing volatilization of the skin moisturizer cream from the pad during storage of the applicator.

4,706,694

DENTAL FLOSS DEVICE

Joseph Lambert, 410 Dogwood La., Christiansburg, Va. 24073

Filed Mar. 24, 1986, Ser. No. 843,341
Int. Cl.[4] A61C *15/00*
U.S. Cl. 132—92 R 5 Claims



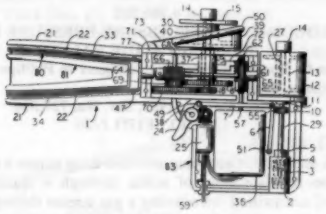
1. A device for holding floss comprising: A handle; a carrier secured to said handle for relative movement therewith; said carrier defining two spaced prongs each with an aperture therethrough where floss can pass and be exposed for use by the user; said prongs extending into a plane displaced from that of the handle; said carrier having a spool for supporting a source of floss and a reel for receiving an end of the floss remote from said source; said reel having a pinch slot for fixing said end of said floss thereto and cooperating with said spool and said prongs to provide a means for maintaining tension on the floss extending through the apertures; a knife fixed to said carrier adjacent said reel for cutting spent floss; said spool being located adjacent one of said prongs and said reel being located adjacent the other of said prongs; said carrier being movable among at least two positions on said handle; a detent means for maintaining said carrier in any one of said positions as selected until moved therefrom by the user.

4,706,695

INTERDENTAL CLEANING AND POLISHING TOOL

Charles L. Urso, 215 Newton St., Waltham, Mass. 02154

Continuation-in-part of Ser. No. 558,826, Dec. 7, 1983, Pat. No. 4,586,521. This application Apr. 10, 1986, Ser. No. 850,221
The portion of the term of this patent subsequent to May 6, 2003, has been disclaimed.
Int. Cl.[4] A61C *15/00*
U.S. Cl. 132—92 R 16 Claims



1. An interdental cleaning tool comprising:

a housing;

a pair of reciprocating tines pivotally supported on the housing wherein the tines receive teeth to be cleaned therebetween, each tine having guides for guiding the transfer of dental floss from one tine to the other tine wherein the floss forms a movable span therebetween;

a dispensing spool having wound dental floss, the spool rotatably supported on the housing for dispensing the

dental floss which passes to a reciprocating tine for supplying the span;

a take-up spool rotatably supported on the housing for retrieving used dental floss passing from a reciprocating tine;

means for reciprocating the tines up and down relative to the teeth;

means for producing continuous slow rotation of the take-up spool in order to produce continuous slow longitudinal movement of the floss span; and

means for separately enclosing each reciprocating tine for shielding the same from contact with oral tissues.

4,706,696

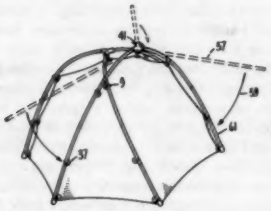
ORBIT TENT

Robert E. Gillis, P.O. Box 67, Aptos, Calif. 95003

Continuation of Ser. No. 639,689, Aug. 10, 1984, abandoned. This application Jan. 16, 1986, Ser. No. 819,368

Int. Cl.[4] E04H *15/04, 15/28, 15/44*

U.S. Cl. 135—102 **10 Claims**



1. In a dome-like tent structure wherein a membrane is kept under tension primarily by a plurality of stressed arcuate poles attached to said membrane whereby said poles exert a force on said membrane which is radially outward, comprising: a membrane having hem sockets, a multiplicity of rigid hubs with each one having a plurality of hub sockets, each of said rigid hubs removably receiving pole members, each pole member stressed into arcuate shape by the ends thereof captured by said hub sockets and said hem sockets, each pole contacting and being retained by said membrane into a tensioned arch by discrete retention means affixed to said membrane, and at least two poles from each hub crossing another pole from another hub, with said crossing tensioning the membrane between said crossed poles for adding stability to the assembled dome-like tent.

4,706,697

REDUCING THE NECESSARY PRESSURE DROP THROUGH SLIDE VALVES

Chester O. Bowen, Borger, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 26, 1985, Ser. No. 727,506

Int. Cl.[4] F17D *1/20*

U.S. Cl. 137—13 **15 Claims**

1. A method for reducing pressure drop across a slide valve used to regulate flow of solids through a standpipe, said method comprising introducing a gas stream through a multiplicity of openings within an inlet means into the standpipe in a direction toward the slide valve from a position closely adjacent to the slide valve.

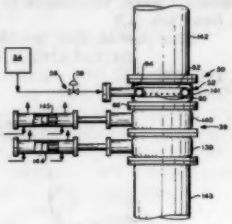
12. Apparatus comprising:

(a) a bin for containing a supply of particulate;

(b) a valve positioned beneath the bin;

(c) a first conduit connecting the bin with the valve, said conduit forming a standpipe;

(d) a hollow sparger ring circumferentially extending around an inside surface of the first conduit between the bin and valve at a position immediately adjacent to the valve, said hollow ring having apertures for introducing a fluid into the first conduit in the direction of the valve to reduce the pressure drop across the valve.



4,706,698

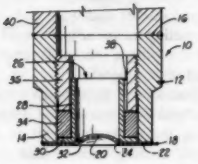
TEMPERATURE RESPONSIVE PRESSURE RELIEF APPARATUS AND METHOD

Edward H. Short, III, Tulsa, Okla., assignor to BS&B Safety Systems, Inc., Tulsa, Okla.

Filed Oct. 18, 1985, Ser. No. 789,186

Int. Cl.[4] F16K *17/14*

U.S. Cl. 137—68.1 **5 Claims**



1. A fluid pressure relief apparatus of the rupturable type which ruptures at different pressure levels depending upon the temperature of the fluid under pressure in contact therewith which comprises:

a hollow body member;

a rupture member sealingly attached to said body member; and

a support member positioned interiorly of said body member adjacent said rupture member whereby said rupture member is supported and caused to rupture at a predetermined rupture pressure thereby, said support member being maintained in place by a solid material substantially confined between said support member and said body member having a selected melting point so that when the temperature of said fluid under pressure reaches a level whereby said material is heated to the melting point thereof, said support member is no longer maintained in place and the support of said rupture member is ceased thereby causing the pressure level at which said rupture member ruptures to be lowered.

4,706,699

STEAM TRAP

Werner Föller, Stuhr, Fed. Rep. of Germany, assignor to Gestra Aktiengesellschaft, Bremen, Fed. Rep. of Germany

Filed Nov. 12, 1986, Ser. No. 929,647

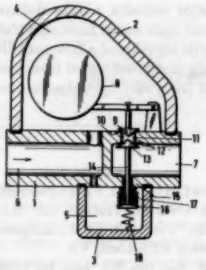
Claims priority, application Fed. Rep. of Germany, Dec. 11, 1985, 3543674

Int. Cl.[4] F16T *1/20*

U.S. Cl. 137—192 **7 Claims**

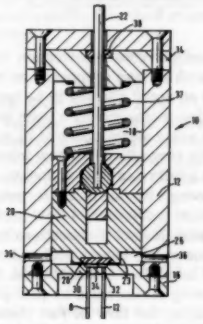
1. A steam trap, comprising:

(a) a first valve seat and a closure valve cooperating therewith;
(b) a control device responsive to the condensate collected in said steam trap for actuating the closure valve of said first valve seat;
(c) a second valve seat disposed downstream from said first valve seat and a closure valve cooperating therewith;



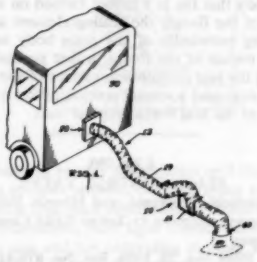
(d) an actuating element for the closure valve of said second valve seat, said actuating element being responsive to pressure and influenced in the closing sense by the inlet pressure prevailing at the steam trap; and
(e) biasing means providing a constant or predetermined opening bias force to the closure valve of said second valve seat.

4,706,700
VALVE ARRANGEMENT
Elizabeth J. Jumeau, Liverpool, England, assignor to The BOC Group, Inc., Montvale, N.J.
Filed Sep. 16, 1986, Ser. No. 907,932
Claims priority, application United Kingdom, Oct. 30, 1985, 8526758
Int. Cl.[4] F16K *13/10*
U.S. Cl. 137—247.29 **5 Claims**



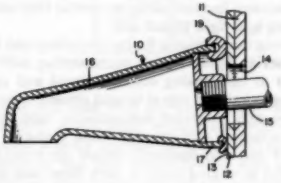
1. A valve arrangement comprising a body having a first inlet for a first control fluid, said body including a first end wall formed with two spaced bores defining respectively a second inlet for a second fluid the flow of which is to be controlled and an outlet for said second fluid, a shallow channel extending between the second inlet and said outlet for the flow of the second fluid, and a member movable from a first position in which said first inlet is isolated from said second inlet and a second position in which said first and second inlets are in communication, the arrangement being such that in the first position of said member the second fluid can flow from said second inlet towards said outlet but when said member is in the second position the pressure of the first control fluid prevents the flow of the second fluid from the second inlet towards said outlet.

4,706,701
ODOR TRAP ASSEMBLY
Robert L. Cresswell, R.D. 1, Box 1081, Hadley, Pa. 16130
Filed Jul. 31, 1986, Ser. No. 891,039
Int. Cl.[4] E03C *1/00*; F16K *13/00, 13/10*; F16L *43/00*
U.S. Cl. 137—247.41 **6 Claims**



1. A portable odor trap assembly for connection between a holding tank outlet and the inlet of a remote collection receptacle; wherein the apparatus comprises:
a drain hose unit comprising an elongated flexible drain hose element adapted to be connected on one end to the said holding tank outlet and having its other end adapted to be in fluid communication with the inlet of said remote collection receptacle and a ground supported frame-work unit,
said hose unit supported on said framework unit, said framework unit comprising an open framework member having at least one elevated support surface formed intermediate its ends, wherein the height of said at least one elevated support surface is sufficient with respect to said hose unit to form an accumulated liquid barrier within said flexible drain hose element in the direction of flow, when a portion of said drain hose element is draped over said at least one elevated support surface element, and effluent from said holding tank is introduced into the interior of said flexible drain hose element.

4,706,702
PLUMBING SEALING SYSTEM
John J. Grasseschi, 1299 Grafton St., Worcester, Mass. 01609
Filed Dec. 17, 1986, Ser. No. 943,312
Int. Cl.[4] F16L *5/00*
U.S. Cl. 137—360 **3 Claims**



1. Plumbing sealing system, comprising:
(a) a fixture including a flange adapted to lie with a edge in spaced relationship to a vertical wall surface adjacent to an aperture in the wall, and
(b) a sealing element lying along and firmly attached to the said edge, while extending in the space between the edge

and the wall surface, the sealing element being formed of an elastomer that is resilient and impervious to water, wherein the said edge of the flange defines a closed circular path confined to a single plane circummscribing the aperture in the wall, wherein the sealing element is in the shape of an annulus, and wherein the sealing element has a porous, very resilient inner body completely surrounded by a non-porous, moderately-resilient skin, and

(c) means including cooperating surfaces of the edge of the flange and the seal to maintain the position of the seal relative to the edge and to prevent a change of the said position, wherein the sealing element has an oval-shaped main body that fits in a rabbet formed on an inside ofthe corner of the flange, the sealing element having a ridge extending outwardly of the main body and around an outside corner of the flange, a first portion of the ridge forming the said cooperating surface of the seal contracting the edge and a second portion of the ridge forming a surface of the seal contacting the wall.

4,706,703

FLUID CONTROL VALVE

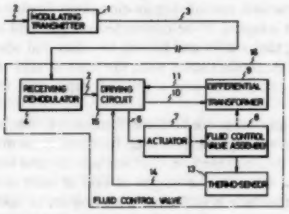
Kunihiko Takeuchi, Kawasaki, and Hiroshi Nogi, Yokohama, both of Japan, assignors to Tokyo Keiki Company Limited, Tokyo, Japan

Filed Jun. 20, 1986, Ser. No. 876,417

Claims priority, application Japan, Jun. 24, 1985, 60-135966

Int. Cl.[4] F16K *31/02*

U.S. Cl. 137—487.5 **2 Claims**



1. In a fluid control valve including a driving circuit for generating a drive signal corresponding to an analog command signal indicative of a flow rate or fluid pressure, an actuator adapted to be operated by said drive signal, a control valve element operable in response to the operation of said actuator, a position sensor for detecting an output position of said actuator, and a feedback circuit responsive to said actuator output position detected by said position sensor to control said drive signal so as to attain said flow rate or fluid pressure indicated by said command signal, the improvement comprising:

a modulating transmitter for converting said analog command signal to a serial digital signal and converting said serial digital signal to a light signal;

a transmission line including an optical fiber cable for transmitting said light signal; and

a receiving demodulator for reconverting said light signal to said serial digital signal, reconverting said serial digital signal to said analog comand signal and supplying said analog command signal to said driving circuit;

whereby said receiving demodulator, said driving circuit, said actuator, said control valve element, said position sensor and said feedback circuit are mounted integrally thereby arranging close to each other said driving circuit and said actuator, said position sensor and said feedback circuit and said feedback circuit and said driving circuit, respectively, wherein said modulating transmitter includes an analog-digital converter for converting said analog command signal to said serial digital signal, a modulator for pulse-duration modulating or pulse-frequency modulating said serial digital signal, and an electro-light convertor for converitng the output signal of said modulator to said light signal, wherein said modulator includes a pulse oscillator for generating clock pulses having a predetermined frequency, a counter for repeating counting of said clock pulses with the same number of positions as a serial digital signal to be transmitted, and a digital comparator for applying to said electro-light convertor a data indicative of a comparison between a serial digital data and a count of said counter, and wherein said receiving demodulator includes a light-electro convertor for converting said light signal from said transmission line to said serial digital signal, and a low-pass filter for demodulating said analog command signal from said serial digital signal generated from said light-electro convertor.

4,706,704

FUEL CONTROL VALVE CONSTRUCTION, PARTS THEREFOR AND METHODS OF MAKING THE SAME

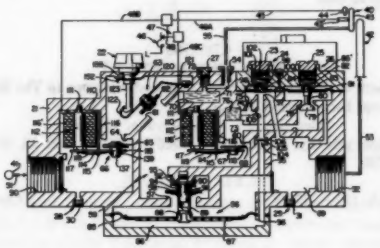
Samuel T. Kelly, Torrance, Calif., assignor to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 766,204, Aug. 16, 1985, Pat. No. 4,610,269, which is a division of Ser. No. 613,462, May 24, 1984, Pat. No. 4,549,571. This application Jun. 11, 1986, Ser. No. 872,975

The portion of the term of this patent subsequent to Oct. 29, 2002, has been disclaimed.

Int. Cl.[4] F16K *31/385*

U.S. Cl. 137—489.5 **6 Claims**



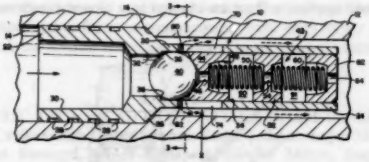
1. In a fuel control valve construction having a housing means provided with an inlet adapted to be interconnected to a fuel source and an outlet adapted to be interconnected to a burner, said housing means having a main pressure regulator means and a main valve means operated by said main pressure regulator means for controlling fuel flow from said inlet to said outlet to provide a full rated flow of fuel to said burner, said housing means having a by-pass means for interconnecting said inlet to said outlet to provide a fuel flow to said burner that is less than a full rated flow of fuel but is sufficient by itself to support combustion at said burner until said main valve means provides said full rated flow of fuel thereto, the improvement wherein said housing means has a by-pass pressure regulator means for controlling the flow of fuel through said by-pass means independently of the operation of said main pressure regulator means, said main pressure regulator means and said by-pass regulator means each being responsive to pressure in said outlet, said by-pass regulator means comprising a normally biased open pressure regulator means which is adapted to be closed by the pressure in said outlet when said full rated flow of fuel is being provided to said burner by said main valve means whereby only said by-pass pressure regulator means of the two pressure regulator means is adapted to control the pressure of said fuel flow that is less than a full rated flow of fuel and only said main pressure regulator means of the two pressure regulator means is adapted to control the pressure of said full rated flow of fuel.

4,706,705

CHECK VALVE

Leighton Lee, II, Guilford, Conn., assignor to The Lee Company, Westbrook, Conn.

Filed Apr. 1, 1986, Ser. No. 846,962
Int. Cl.[4] F16K *21/10*
U.S. Cl. 137—514.5 11 Claims



8. A check valve comprising:

a generally tubular body adapted for mounting in a counterbore of a fluid conduit comprising a generally cylindrical base and a guide sleeve axially extending from said base, said body forming an axially extending fluid passageway and an interior valve seat surrounding said passageway at an intermediate axial location thereof, said guide sleeve forming a plurality of angularly spaced discharge openings axially spaced from said valve seat and a pair of orifices axially spaced from said valve seat between said valve seat and said openings;

a ball closely received in said guide sleeve and axially displaceable therein, said ball being adapted for seating against said valve seat for sealing engagement therewith; and

biasing means to axially bias said ball into sealing engagement with said valve seat, said biasing means comprising a pair of aligned springs and a damping member interposed between said springs and axially displaceable in said guide sleeve;

so that when a differential pressure applied to the ball produces a force that exceeds the opposing force exerted by said biasing means, said ball is axially displaced in said guide sleeve to a position wherein a fluid flow path extends generally axially through said valve seat and into said guide sleeve and thereafter generally radially through said orifices and openings for flow generally exteriorly of said guide sleeve.

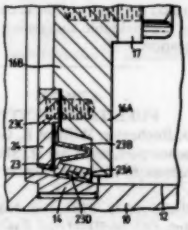
4,706,706

CHECK VALVE AND A SEAL FOR A CHECK VALVE

Robert G. Page, Farnham, and John S. Milton, Guildford, both of England, assignors to Corrotex Limited, Surrey, England

PCT No. PCT/GB85/00527, § 371 Date Jul. 18, 1986, § 102(e) Date Jul. 18, 1986, PCT Pub. No. WO86/03273, PCT Pub. Date Jun. 5, 1986
PCT Filed Nov. 19, 1985, Ser. No. 887,044
Claims priority, application United Kingdom, Nov. 19, 1984, 8429200
Int. Cl.[4] F16K *15/03, 15/18, 25/00*
U.S. Cl. 137—527.8 8 Claims

1. A check valve comprising a housing which forms a through passage which is to be connected into a fluid pipeline when the valve is in use, the housing including an annular valve seat which extends around the passage and tapers towards the upstream end of the passage in the context of the normal direction of flow through the passage, and an obturating member cooperable with the valve seat to close the through passage and displacable from the valve seat to allow fluid flow through the through passage, the obturating member carrying an annular seal which effects a seal between the obturating member and the valve seat when the through passage is closed by the obturating member, wherein the annular seal comprises a floating ring seal, and an abutment surface extends around at least part of the passage downstream of the valve seat, the obturating member being adapted to make direct face-to-face contact with the abutment surface when it closes the through passage and being formed to provide for access to the annular seal for reverse fluid flow when the passage is closed by the obturating member, the obturating member, abutment surface, valve seat and annular seal being arranged



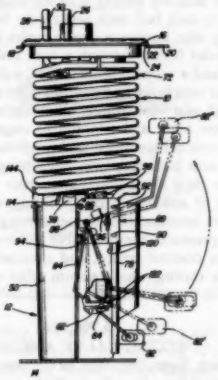
such that the housing reacts a load exerted on it through and by the obturating member without that load being applied to the annular seal such that, once initial contact of the seal with the valve seat is established, fluid tight contact between the seal and the valve seat and the obturating member is established solely by the action of fluid pressure on the seal.

4,706,707

FUEL INLET ASSEMBLY

Joseph T. Betterton, Arab; Alan W. Dykoski, Huntsville; Alfred H. Glover, Decatur; Daniel F. Lawless, Hazel Green; William D. McKee, Huntsville, and Troy T. Watson, Decatur, all of Ala., assignors to Chrysler Motors Corporation, Highland Park, Mich.

Filed Sep. 11, 1986, Ser. No. 906,049
Int. Cl.[4] E03B *11/16;* F04B *11/00*
U.S. Cl. 137—565 1 Claim



1. In a vehicle fuel tank with top and bottom walls, a fuel delivery assembly, comprising: a fuel reservoir enclosure means for storing a small quantity of fuel; a fuel pump in the reservoir enclosure, the fuel pump having inlet and outlet means; a combined fuel return conduit and support for positioning the assembly in the fuel tank in registered relation to a bottom wall thereof; a support cover member connected to the fuel tank; the fuel return conduit and support being in the form of a hollow metallic tube with a substantially helical configuration, an upper end of the tube being attached to the support member and the lower end portion of the tube terminating near the tank bottom and being operably attached to the reservoir

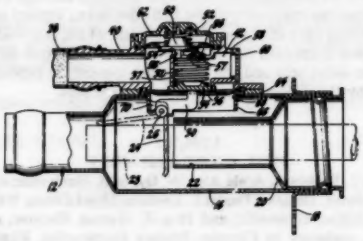
means and fuel pump; the helical tube having axially spaced coils between its end portions for allowing a variance in the axial length of the combination fuel return and support, the axial length of the helical configuration being selected in relation to the dimensions of the fuel tank to produce a decreased axial length of the helical configuration when the assembly is installed in the fuel tank and the support cover is attached to the fuel tank so that the reservoir is forced against the fuel tank bottom wall by the yieldable shortening in axial length of the helical configuration.

4,706,708

FUEL TANK VENTING

Joseph Fornuto, Rochester; William E. Gifford, Hemlock; Daniel Nolan, Spencerport, and Carl H. Sherwood, Brookport, all of N.Y., assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 23, 1986, Ser. No. 877,201
Int. Cl.[4] B65B *31/00*; F16K *24/00*
U.S. Cl. 137—588 **1 Claim**



1. A fuel tank filler neck assembly, said assembly comprising a filler neck adapted for connection to a fuel tank, a plate that pivots between a position restricting said filler neck and a position permitting introduction of fuel through said filler neck, a vent housing having a vapor inlet fitting adapted for connection to said fuel tank separately from said filler neck, said housing also having a vapor outlet fitting connected to said vapor inlet fitting through a vent orifice, a pressure control orifice, and a vacuum relief orifice, a diaphragm vent valve isolating said vent housing from said filler neck and controlling flow through said vent orifice, an actuating arm pivoted with said restrictor plate and adapted to engage said vent valve across said vent orifice when said restrictor plate restricts said filler neck, said actuating arm permitting said vent valve to allow vapor flow from said vapor inlet fitting through said vent orifice to said vapor outlet fitting when said restrictor plate permits introduction of fuel through said filler neck, a diaphragm pressure control valve controlling flow through said pressure control orifice, and a vacuum relief valve controlling flow through said vacuum relief orifice.

4,706,709

MIXING VALVE ASSEMBLY

Heiner Monch, Kenn, Fed. Rep. of Germany, assignor to American Standard Inc., New York, N.Y.

Filed Mar. 12, 1986, Ser. No. 838,859
Claims priority, application Fed. Rep. of Germany, Mar. 16, 1985, 3509649; Mar. 18, 1985, 3509648
Int. Cl.[4] F16K *11/22, 3/26*
U.S. Cl. 137—597 **7 Claims**

1. In combination, a mixing valve assembly and an appliance valve assembly comprising:

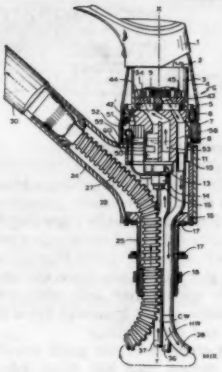
a valve housing having said mixing valve and appliance valve assemblies mounted therein;

said mixing valve assembly including valve means in the form of a valve cartridge and having hot and cold water passages and a mixed water discharge passage;

an insert mounted in said housing including hot and cold water inlet conduits and a mixed water conduit coupled, respectively, to said hot and cold water passages and said mixed water discharge passage of said cartridge valve;

said insert including a shut-off valve having at least one water passageway coupled to at least one of said hot and cold water conduits of said insert and a water discharge conduit to be coupled to an appliance;

said shut-off valve having means to control water flow to said appliance from an opened to a closed position;



said mixing valve assembly having means to control water flow through said mixed water discharge passage of said mixing valve independently of said appliance valve means; and

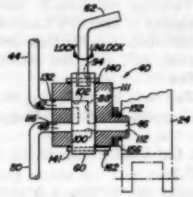
said shut-off valve, said insert, said valve cartridge, said means to control said shut-off valve and said valve housing are arranged coaxially.

4,706,710

CYLINDER-MOUNTED ROTARY VALVE

Vernis H. Meyer, 1805 State St., Granger, Iowa 50109, and Francis E. Schlueter, 6666 NW. Fifth St., Des Moines, Iowa 50313

Filed May 20, 1986, Ser. No. 864,980
Int. Cl.[4] F16K *11/085*
U.S. Cl. 137—625.47 **8 Claims**



1. For an implement with a hydraulic lift cylinder having a cylinder port for receiving fluid under pressure from a source to operate the cylinder, a rotary valve comprising:

a valve body having an input port and an output port and a bore;

a spool rotatably mounted in the bore and including a passage;

means for rotating the spool between open and closed positions, wherein in the open position the input and output ports are in fluid communication with each other through the passage, and in the closed position the input and out-

put ports are closed to fluid communication with respect to each other;

wherein the valve body includes means adapted for directly connecting the output port to the lift cylinder port; and wherein the valve body includes a second output port, means for connecting the second output port to the input port of a second hydraulic lift cylinder for operating the lift cylinders in parallel when the spool is rotated to the open position, and means for blocking the first and second output ports from communication with each other and with the source when the spool is in the closed position.

4,706,711

ELASTIC TECHNICAL HOSE WITH A FOAM INSERT

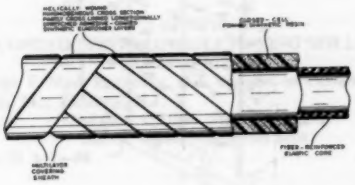
Tibor Czvikovszky; Gábor Kovács; Endre Lakner; Lajos Mahr; Ágnes Somogyi, all of Budapest; Sándor Mikes, Szeged; György Kégly, Budapest; István Muzsai, Budapest; László Palotás, Budapest, and Nándor Pfisztner, Budapest, all of Hungary, assignors to Taurus Gumiipari Vallalat, Budapest, Hungary

Filed Sep. 12, 1985, Ser. No. 775,080

Claims priority, application Hungary, Sep. 12, 1984, 3438/84

Int. Cl.[4] F16L *55/00*

U.S. Cl. 138—103 **3 Claims**



1. In an elastic technical hose with a foam insert, expediently a maritime floating hose for drawing-off oil, consisting of an inner elastic layer, said layer containing fiber reinforcement, a synthetic foam layer with closed cells assuring floating ability even in a filled state of the hose and an outer coating sheet, the improvement wherein the outer coating sheet of the hose is a multilayer system, the components of which are synthetic elastomer layers inhomogeneous in cross-section and previously partly cross-linked and stretched longitudinally, which are interconnected by adhesive layers.

4,706,712

HOSE CONSTRUCTION

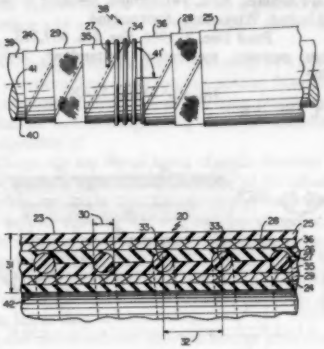
Donald L. Oglesby, and Robert H. Sinnamon, both of Ocala, Fla., assignors to Dayco Products, Inc., Dayton, Ohio

Filed Mar. 27, 1986, Ser. No. 845,142

Int. Cl.[4] F16L *11/08*

U.S. Cl. 138—126 **14 Claims**

1. In a hose construction having a tubular wall comprising an inner layer of polymeric material, an outer layer of polymeric material, an intermediate layer of polymeric material disposed between said inner and outer layers, a helically wound thermoplastic monofilament of substantially circular transverse cross-sectional configuration embedded in said intermediate layer, a first ply of woven material disposed intermediate said outer layer and said intermediate layer, and a second ply of woven material disposed intermediate said inner layer and said intermediate layer, the improvement wherein said monofilament has a diameter that has a length that is approximately one-third of the thickness of said wall and that is approximately one-third of the longitudinal cross-sectional distance between the centers of each pair of adjacent turns of said monofilament when considering a longitudinal cross section of said hose construction whereby said hose construction will substantially return to its original shape even after said hose construction has been collapsed by having a vacuum of approximately 24 inches Hg applied therein or by having been run over by a pair of tractor



trailer wheels of a loaded vehicle of approximately 60,000 pounds net weight.

4,706,713

FLEXIBLE COMPOSITE PIPE FOR HIGH-TEMPERATURE FLUIDS

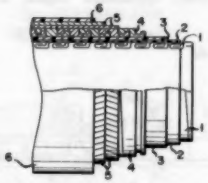
Kazuo Sadamitsu, Yamato, and Yoshiyuki Makino, Ichihara, both of Japan, assignors to Furukawa Electric Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 746,247, Jun. 18, 1985. This application Nov. 26, 1986, Ser. No. 935,125

Claims priority, application Japan, Jun. 20, 1984, 59-125015; Mar. 25, 1985, 60-41476[U]

Int. Cl.[4] F16L *11/00*

U.S. Cl. 138—137 **3 Claims**



1. A flexible composite pipe for transporting a high-temperature fluid, comprising:

an inner pipe consisting of a pipe obtained by extruding one member selected from the group consisting of polyvinylidene fluoride copolymer resins, blends thereof with polyvinylidene fluoride resins, and compositions based on the polyvinylidene fluoride polymer resins, which have, when hot pressed into a sheet, and Izod impact strength of not less than 10 kg-cm/cm and an apparent Young's modulus intension of not more than 90 kg/mm^2;

an inner reinforcing layer formed around said inner pipe and an outer reinforcing formed around said inner reinforcing layer, a grease being injected in said inner and outer reinforcing layers;

a plastic film inserted between said inner and outer reinforcing layers, and

a protective sheet layer coated around said outer reinforcing layer.

4,706,714

MOUNTING ARRANGEMENT FOR A SWITCHING UNIT FOR A LOOM

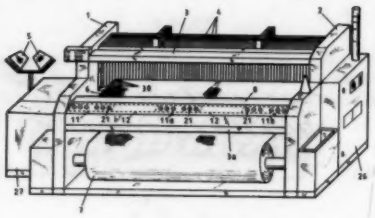
Bernhard Schärer, Ruti, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Dec. 3, 1986, Ser. No. 937,213

Claims priority, application Switzerland, Dec. 4, 1985, 5157/85

Int. Cl.[4] D03D *51/04*

U.S. Cl. 139—1 R 14 Claims



1. In a loom, the combination comprising

a drive system;

a cross-beam extending over a weaving width of the loom;

at least one bar-like guide member mounted on said cross-beam;

at least one switching unit displaceably guided within said guide member and having a plurality of control elements connected to said drive system for controlling the loom; and

means for locating said switching unit within said guide member.

4,706,715

MANDREL FOR USE WITH LOOM FOR FORMING LOOPS OF SURFACE-TYPE FASTENERS

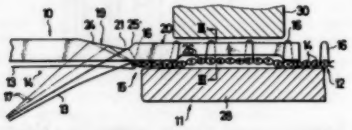
Ryuichi Murasaki, Toyama, Japan, assignor to Yoshida Kogyo, K. K., Tokyo, Japan

Filed Nov. 26, 1986, Ser. No. 935,035

Claims priority, application Japan, Dec. 5, 1985, 60-187698[U]

Int. Cl.[4] D03D *39/20*

U.S. Cl. 139—46 6 Claims



1. A mandrel for use with a loom for the formation of loops projecting from a foundation fabric as the latter is woven on the loom, said mandrel comprising:

an elongate bar for being disposed closely over one surface of a foundation fabric while being woven and extending perpendicular across a fell of the foundation fabric, said elongate bar including

a longitudinal loop-forming portion adapted to be disposed substantially upstream of the fell for supporting thereon the loops during their formation,

a longitudinal loop-setting portion contiguous to said loop-forming portion and adapted to be disposed substantially downstream of the fell for tensioning the loops after their formation to set the latter in upstanding positions,

a generally V-shaped first recess defined in an upper longitudinal edge of said elongate bar and extending in and between said loop-forming portion and said loop-setting portion for receiving therein the loops before their formation, and

an elongate second recess defined in a lower longitudinal edge of said elongate bar and extending along a limited longitudinal part of said loop-setting portion for releasing a tension on the loops.

4,706,716

HEALD FRAME FOR A WEAVING LOOM

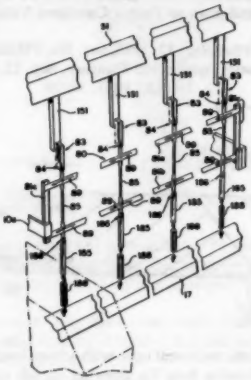
John D. Griffith, Boldon, England, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Division of Ser. No. 618,046, Jun. 7, 1984, abandoned. This application Apr. 7, 1986, Ser. No. 848,921

Claims priority, application United Kingdom, Jun. 16, 1983, 8316401

Int. Cl.[4] D03C *9/06*

U.S. Cl. 139—91 9 Claims



1. A heald frame for a weaving loom comprising an upper cross-member and a lower cross-member adapted to support healds directly therebetween, said upper and lower cross-members being joined together by spaced end members, a plurality of connection members spaced along the length of the cross-members between the end members and attached to the cross-members to restrain relative movement between the cross-members and retain a constant spaced relationship between the cross-members along their length, said connection members having portions of a narrow width extending between the upper and lower cross-members so that, during weaving, warp yarns pass the connection members without interference, and first and second connection means disposed, respectively, at opposite ends of each connecting member for connection to means for causing reciprocation of the frame.

4,706,717

HEDDLE FRAME FOR A HIGH SPEED WEAVING MACHINE

Steven J. Root, Mauldin, and James D. Grigsby, Greenville, both of S.C., assignors to Steel Heddle Manufacturing Co., Inc., Greenville, S.C.

Filed Aug. 25, 1986, Ser. No. 899,983

Int. Cl.[4] D03C *9/06*

U.S. Cl. 139—92 17 Claims

1. In a heddle frame having a metal cross rail, a heddle bar for supporting heddles connected to the cross rail at at least two spaced points, at least one of the connections between the heddle bar and the rail comprising:

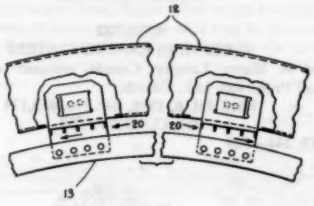
(a) an opening in the cross rail;

(b) a rigid hanger having a first end portion which extends into said opening in said cross rail which has a width less

than the length of said opening and which has a second end portion connected to said heddle bar;

(c) an elongated substantially rectangular opening in the first end portion of said hanger; and

(d) a rigid, substantially rectangular insert having a length



which is less than the width of the opening in said first end portion disposed within said opening in said end portion and having at least one rigid connection to the side walls of said rail, whereby said hanger is retained within said rail while permitting limited lateral movement of the hanger relative to said cross rail.

4,706,718

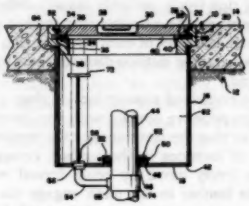
CONTAINMENT MANHOLE HAVING SPILLAGE SEALING MEANS

Joseph V. Milo, Rockaway, N.J., assignor to Universal Valve Co., Inc., Elizabeth, N.J.

Filed Jun. 17, 1986, Ser. No. 875,271

Int. Cl.[4] F16L *5/00*; B15B *3/06*

U.S. Cl. 141—86 **3 Claims**



1. A containment manhole for containing product spills at and about the upper end of a fill pipe leading to an underground product storage tank comprising

a fill pipe having an upper end,

a hollow body surrounding the upper end of the fill pipe,

the hollow body comprising enclosing sidewalls,

the sidewalls terminating upwardly in circular top and downwardly in a circular bottom;

an annular upper ring secured to the said circular top in a leak-proof interconnection,

the upper ring comprising an upper circular ledge of a first, outer diameter, the upper circular ledge terminating radially inwardly in a depending inner vertical surface of second inner diameter,

the upper ring further comprising a second, lower ledge, the second ledge being spaced below the inner vertical surface, the second ledge extending radially inwardly to define an inner periphery of the upper ring of a third diameter, the third diameter being smaller than the first and second diameters, the inner periphery of the upper ring being positioned radially inwardly of the said enclosing sidewalls;

a bottom plate secured to the hollow body at the said circular bottom in a leak-proof circular junction,

the bottom plate being provided with an opening to receive the upper end of the fill pipe therein;

a circular cover removably supported over the hollow body upon the upper ring, the cover having a generally planar top surface and a bottom surface spaced below the top surface,

the cover being defined radially outwardly by a top flange and a bottom flange, the top and bottom flanges defining a circular, radially outwardly open groove therebetween, the bottom flange being of smaller diameter than the diameter of

the top flange, the top flange being of outer diameter that is greater than the second inner diameter of the inner vertical surface and the bottom flange being of outer diameter that is smaller than the said second inner diameter;

a first seal means secured upon the second ledge and substantially covering the second ledge, a portion of the bottom flange of the cover contracting and sealing against the first seal means to prevent leakage between the cover and the annular upper ring;

a second seal means secured upon the bottom plate about the said opening and in contact with the fill pipe to prevent the leakage of product therebetween, the second seal means being capable of permitting limited relative movement between the fill pipe and the manhole bottom while sealing; and

a resilient gasket positioned within the said cover circular groove, the gasket contacting the said inner vertical surface of the upper ring to additionally prevent leakage between the cover and the annular upper ring.

4,706,719

FUNNEL

Aarnoud W. Eversdijk, Wijkselaan 4, 2554 GE, The Hague, Netherlands

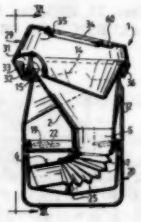
PCT No. PCT/NL86/00003, § 371 Date Sep. 18, 1986, § 102(e) Date Sep. 18, 1986, PCT Pub. No. WO86/04318, PCT Pub. Date Jul. 31, 1986

PCT Filed Jan. 21, 1986, Ser. No. 916,486

Claims priority, application Netherlands, Jan. 21, 1985, 8500149

Int. Cl.[4] B65B *3/04*

U.S. Cl. 141—98 **20 Claims**



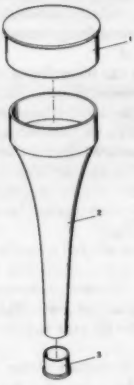
15. A storable funnel assembly comprising the combination of a main body having an outer wall portion shaped for ease of gripping and manipulation and defining a funnel chamber therewithin into which liquid is to be received, a spout extending downwardly from said main body for directing liquid from said funnel chamber into an entity which is to receive the liquid, removable cover means for removably closing the mouth of said funnel chamber to prevent leakage of liquid from the assembly through the mouth of the funnel chamber when the assembly is to be stored, and removable spout container means for removably enclosing said spout to prevent leakage of liquid from the assembly through the spout when the assembly is to be stored.

4,706,720

CLEAN FUNNEL

O. H. Pattison, and Will Pattison, both of Star Rte.-Box 58, Clovis, N. Mex. 88101

Filed Mar. 21, 1986, Ser. No. 842,271
Int. Cl.[4] B67C *11/00*
U.S. Cl. 141—327 9 Claims



1. A clean funnel comprising:

a funnel shaped housing having a large substance intake opening and a small substance outlet opening;

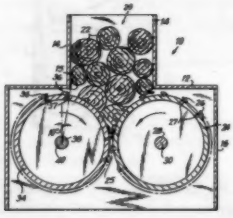
an entirely removable first closure cap means for sealing said large substance intake opening and an entirely removable second closure cap means for sealing said small substance outlet opening, said first closure cap means and said second closure cap means each being sufficiently tight when in place to remain in place under conditions of funnel handling and movement and to prevent contamination of said funnel during periods of nonuse.

4,706,721

DOUBLE-DRUM WOOD CHIPPER APPARATUS

Kenton J. Brown, 5613 Regency Oaks Dr. North, Mobile, Ala. 36609

Filed Nov. 27, 1985, Ser. No. 802,495
Int. Cl.[4] B27C *1/00*; B02C *18/18*
U.S. Cl. 144—174 7 Claims



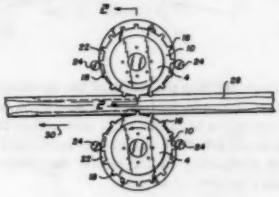
1. A double-drum wood chipper apparatus for making wood chips from logs, the apparatus including, a pair of hollow drums mounted on parallel axes to thereby define a nip portion between their cylindrical surfaces, each drum having an open end, each drum mounted for rotation such that the oppositely facing nip surfaces rotate in the same direction, each drum carrying a plurality of angularly spaced knives extending outwardly from its cylindrical surface and being slanted in the direction of its respective drum rotation, a wood chip receiving aperture extending through each drum at a location contiguous to each knife, a vertically disposed log supply hopper having spaced apart vertically disposed walls and positioned above the drums, at least the lower portions of said hopper walls being spaced apart a distance less than the distance between the said parallel axes and located substantially centrally between said parallel axes.

4,706,722

INCISOR CLEANING SYSTEM

Ronald W. Silcox, Langley, Canada, assignor to B.C. Clean Wood Preservers Ltd., Canada

Filed Jul. 8, 1986, Ser. No. 883,174
Int. Cl.[4] B27J *7/00*
U.S. Cl. 144—329 10 Claims



10. A method for operating a lumber incisor for forming a pattern of incisions in the outer surface of a piece of lumber during an incising operation and for self-cleaning the lumber incisor, the method comprising:

providing a rotatable drum having a plurality of annular incisor rings mounted on the drum to turn with the drum, with teeth spaced apart along the periphery of each incisor ring, each tooth extending outwardly from a tooth base on the periphery of the incisor ring; and an annular cleaning ring freely movable radially outwardly from the drum between the neighbouring incisor rings, in which the outside diameter of each cleaning ring is at least equal to the incisor ring outside diameter plus the height of one tooth; and

forcing the combined annular incisor rings and the cleaning rings into pressure contact with the outer surface of the lumber so that the teeth engage the lumber for forming a pattern of incisions in the lumber, causing the cleaning rings to freely move by being forced outwardly away from the lumber as the teeth engage the lumber so the cleaning rings project beyond the teeth for a sub-stantial portion of the periphery of the cleaning rings to push outwardly from the teeth any substances attached to them from the incising operation.

4,706,723

RIM FOR HEAVY, OFF-ROAD VEHICLES

Frederick W. Loeber, Tulsa; Nolan W. Cummins, Bristow; Rodger L. Modglin, Kelleyville, and George O. Greene, Glenpool, all of Okla., assignors to Unit Rig & Equipment Company, Tulsa, Okla.

Filed Apr. 14, 1986, Ser. No. 851,096
Int. Cl.[4] B60B *25/04*
U.S. Cl. 152—410 5 Claims

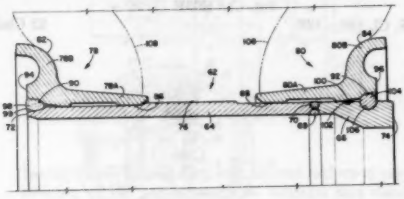
1. A rim for a wheel for use on a heavy, off-road vehicle, comprising:

a tubular rim base member having a first and a second end and having an inner and outer circumferential surface, the rim base member having a circumferential groove in the outer cylindrical surface adjacent the second end thereof;

first and second substantially identical circular bead flanges, each having an inner and an outer end and an inside and an outside surface, each having an internal diameter permitting sliding reception onto said rim base member, each having a circumferential recess in said inside surface at said outer end, the first bead flange being received on and

welded to said rim base member, the weld being formed in said first bead flange circumferential recess and at said rim base member first end; and

a split lock ring removably receivable within said rim base member circumferential groove, said second bead flange being received on said rim base member at said second end and said recess in the said inside surface at said outer end thereof, said second bead flange when urged towards said rim base second end engages the lock ring to prevent the lock ring from escaping out of said semi-circular groove,



and the lock ring prevents said second bead flange from passing off the second end of said rim base member, said first and second bead flanges being configured to receive the opposed beads of a tire mounted thereon,

wherein said rim base member has an external circumferential recess in said outer circumferential surface at said inner end, which recess is opposed to said circumferential recess in said first bead flange, said weld being formed in said opposed recessess in said rim base member and said first bead flange.

4,706,724

PNEUMATIC TIRES FOR MOTORCYCLES

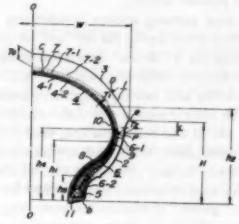
Shinichiro Ohkuni, Akishima, and Shinichi Tamada, Sayama, both of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Continuation of Ser. No. 691,351, Jun. 7, 1984, abandoned, which is a continuation of Ser. No. 483,035, Apr. 7, 1983, abandoned. This application Dec. 9, 1985, Ser. No. 806,134

Claims priority, application Japan, Apr. 23, 1982, 57-077

Int. Cl.[4] B60C *15/00, 15/06*

U.S. Cl. 152—454 **4 Claims**



1. A pneumatic tire used on the road for motorcycles comprising; a tread portion extending over a region for defining a maximum width of the tire, a pair of sidewall portions extending inwardly from both ends of said tread portion, a pair of bead portions at inner edges of said sidewall portions, a toroidal carcass reinforcing these portions and composed of at least one rubberized cord ply containing organic fiber cords arranged at an angle of 50°–90° with respect to the equatorial plane of the tire, both end portions of said cord ply being wound around bead rings to form turnups at said a bead portions, a belt disposed between said tread portion and a crown region of said carcass and composed of at least one cord layer containing aromatic polyamide fiber cords arranged at an angle of not more than 30° with respect to the equatorial plane of the tire, and having an aspect ratio of not more than 86%, a ratio (L/H) of a radial distance L between an edge e of the tread and a position P of a maximum width of said carcass to a radial height H of said sidewall portion is not more than 20%, a stiffener inclusive of a tapered rubber filler having a Shore A hardness of at least 60° disposed between said carcass and said turnup thereof within a range of 50–75% of a radial height of the sidewall portion from an upper part of said bead ring, each of said sidewall portions having a rubber thickness of 4–8 mm at a position corresponding to said maximum width of said carcass, wherein a radial height extending from the bead base to an end in the tread direction of said turnup of said carcass is at least 60% of the radial height of said sidewall portion so as to provide gradually decreasing stiffness thereamong, and said tread portions has a rubber thickness (T_o) being thickest at a widthwise center of said tread portion and gradually reducing toward a point (D) corresponding to $\frac{1}{4}$ of a peripheral length of said tread portion remote from the side edge thereof, and a thickness (T_1) of rubber of said tread portion at said point (D) has a ratio of 45–90% of said rubber thickness (T_o) at the center of said tread portion.

4,706,725

PNEUMATIC SEMI-RADIAL TIRES FOR MOTORCYCLES

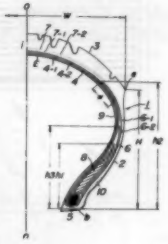
Shinichiro Okuni, Akishima, and Yoichi Kitazawa, Higashiyamato, both of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Continuation of Ser. No. 397,332, Jul. 12, 1982, abandoned. This application Jan. 30, 1984, Ser. No. 574,645

Claims priority, application Japan, Aug. 4, 1981, 56-121324

Int. Cl.[4] B60C *9/00, 15/06*

U.S. Cl. 152—541 **10 Claims**



1. A pneumatic semi-radial tire comprising:

a tread;

a pair of sidewalls toroidally extending from said tread;

a toroidal carcass reinforcing said tread and sidewalls and composed of two rubberized plies each containing organic fiber cords inclined at an angle of 60°–85° with respect to the equatorial plane of the tire, end portions of at least one rubberized ply of said carcass being wrapped around a bead ring embedded in each radially inner end portion of said sidewalls and extending toward said tread to form a turnup portion;

said tread extending between said sidewalls up to both positions corresponding to a maximum width of the tire parallel to said carcass at substantially an equal thickness;

a stiffener inclusive of a tapered rubber filler with a Shore A hardness of at least 60° extending from an upper part of said bead ring toward said tread and disposed between said carcass and said turnup portion thereof;

a belt disposed between said tread and said carcass at a width corresponding to a tread width, said belt laid in parallel as a whole with a contour of the radial section of said toroidal carcass, said belt composed of at least two rubberized

plies each containing cords with a modulus of elasticity of at least 600 kg/cm^2 arranged at an inclination angle of 15°–30° with respect to the equatorial plane of the tire, said cords of said belt plies being crossed with each other;

a radial height (h_1) of the top end of said stiffener as measured from a bead base being within a range of 50%–75% of a radial height (H) of said sidewall as measured from the bead base and, radial heights (h_2) and (h_3) of the top ends of said turnup portions of the inner and outer plies of the carcass being located at positions corresponding to at least 60% of said radial height (H) of said sidewall as measured from the bead base, and top ends of said stiffener and turnup portions arranged to provide a gradually decreasing stiffness thereamong in said sidewall toward the tread; and

one of the rubberized plies of said belt composed of steel cords, each cord formed by twisting 6 to 25 steel filaments with a diameter of not more than 0.12 mm, and having a spacing ratio of 35%–65% defined by $(f-d)/f\times 100$, wherein f is a center distance between cords and d is a diameter of cord, wherein said defined structure is a motorcycle tire.

4,706,726

ELECTRIC CONTROL OF VENETIAN BLIND

Soren B. Nortoft, Virum, Denmark, assignor to V. Kann Rasmussen Industri A/S, Soborg, Denmark

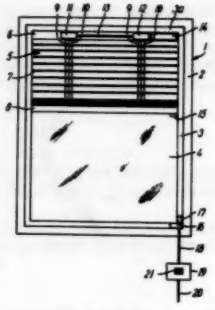
PCT No. PCT/DK86/00003, § 371 Date Aug. 13, 1986, § 102(e) Date Aug. 13, 1986, PCT Pub. No. WO86/04109, PCT Pub. Date Jul. 17, 1986

PCT Filed Jan. 9, 1986, Ser. No. 899,296

Claims priority, application Denmark, Jan. 10, 1985, 114/85

Int. Cl.[4] E06B *9/30*

U.S. Cl. 160—168 R **9 Claims**



1. In the combination of an electric control system for an electric Venetian blind and a Venetian blind having a head rail, a lower list, a plurality of slats, ladder tapes supporting the slats, lift cords connected to the lower list, and a drive mechanism including spring clutches for driving the ladder tapes, the spring clutches being associated with a drive shaft, and being movable upon rotation of the drive shaft over a limited arc and moveable relative to the drive shaft when the spring clutches reach the limit of the limited arc, and the lift cords being connected to the drive shaft for raising and lowering the lower list in response to rotation of the drive shaft, and a reversible electric motor for driving the drive shaft, the improvement comprising:

a control circuit for supplying current to the motor, said control circuit including first means for supplying a first current to the motor for a predetermined time to drive the motor at a first speed in either direction, as chosen by a user, to slowly change the angle of the slats by movement of the spring clutches, and said control circuit further including second means for supplying a second current, greater than said first current, for driving the motor at a second speed, greater than said first speed, in the direction chosen by the user, to raise or lower the lower list by means of the lift cords connected to the drive shaft.

4,706,727

DOOR OPERATOR

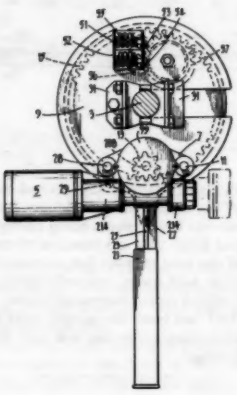
Simon Leivenzon, and Zvi Leivenzon, both of Caulfield, Australia, assignors to Firmagroup Australia Pty. Ltd., Australia

Filed May 9, 1985, Ser. No. 732,286

Claims priority, application Australia, May 11, 1984, PG4963

Int. Cl.[4] E05F *11/00*

U.S. Cl. 160—188 **15 Claims**



1. In a door operator with limit stop sensing means, said operator comprising

(a) a reversible electric motor for driving the door between the opened and closed positions;

(b) drive means connected with the reversible electric motor and connectable with said door to effect such opening and closing;

(c) said drive means including drive releasing means for releasing drive between said reversible electric motor and said door to permit said door to be manually opened in the event of power failure,

said limit stop sensing means comprising two driven type limit stop sensors, one being for an "up" or open limit stop and the other being for a "down" or closed limit stop,

the improvement comprising each of said limit stop sensors being zero setable and having respective switch means associated therewith which is only operable when either of said limit stop sensors are at the zero position, said respective stop sensors being connectable with said reversible electric motor to switch off power to said reversible electric motor when operated, whereby said limit stop sensors may be zeroed to set the "up" and the "down" positions respectively, when drive from the motor to said garage door will stop.

4,706,728

APPARATUS FOR MOUNTING SCREENS

Donald McKay, c/o Low-Drape, 25 Colvilles Place, Kelvin Industrial Estate, East Kilbride, Glasgow, Scotland G75 0PZ

Filed Mar. 3, 1986, Ser. No. 835,539

Int. Cl.[4] A47H *1/00*

U.S. Cl. 160—339 **2 Claims**

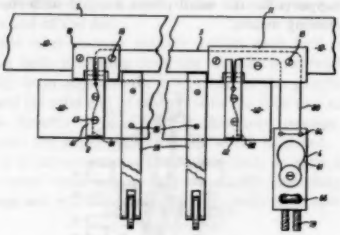
1. Apparatus for mounting screens comprising:

a mounting member for attaching to a support surface; a support member having means for supporting a curtain rail;

a suspension member extending from said mounting member

and engaging said support member, said suspension member providing means for producing vertical movement of said support member;

and stabiliser means, extending from said support member,



having means for engaging said support surface to prevent twisting of the support member wherein said stabilizer means are in the form of struts extending from the support member, said struts having wheel means for engaging the support surface.

4,706,729

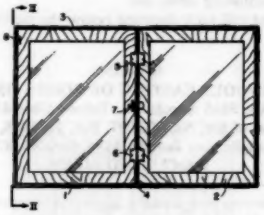
INTERIOR STORM WINDOW

Thomas Sixsmith, 22016 Buenaventura St., Woodland Hills, Calif. 91364

Filed Aug. 18, 1982, Ser. No. 409,063

Int. Cl.[4] A47H *3/00*

U.S. Cl. 160—369 **2 Claims**



1. An interior storm window comprising a frame having a rectangular outer edge which is beveled at about an angle of 20° with the horizontal, said frame having an inside and outside transparent plastic cover sealed along the edge between which there is contained a dead air space, a strip of foam plastic material surrounding said edge on all four sides, and constituting the sole fastening means between said frame and window, and a pair of pull tabs in the form of loops of material whose edges are fastened between said foam strip and window frame to enable easy grasping of the interior storm window for removal or for insertion into a window frame.

4,706,730

MIXING AND CASTING APPARATUS

Luis E. Sanchez-Caldera, Hudson; Nam P. Suh, Sudbury; Jung-Hoon Chun, Hopedale; Arthur K. Lee, Clinton, all of Mass., and Frederick S. Blackall, IV, Cumberland, R.I., assignors to Mixalloy Corporation, Hudson, Mass.

Filed Jan. 27, 1987, Ser. No. 6,886

Int. Cl.[4] B22D *18/00, 35/00*

U.S. Cl. 164—135 **12 Claims**

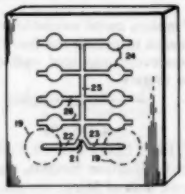
1. An apparatus comprising

means for providing two or more materials in a molten or a slurry state, at least one of which includes a metal;

means for supplying each of said materials to separate channels each having means for moving said materials through said channels;

one or more mixing regions for receiving said two or more materials from said channels;

means associated with each channel for supplying the materials therein from said channels substantially simultaneously to said one or more mixing regions, the materials thereby indirectly impinging on each other in each of said one or more mixing regions so as to form a composite mixture thereof; and



means for supplying said composite mixture to one or more cooling die regions for casting said composite mixture into articles, the supplying of said materials, the forming of a composite mixture thereof, and the casting of said composite mixture into articles being performed in a substantially continuous operation.

12. A method in accordance with claim 11 wherein said cooling region is a cooling die region to cast said mixture into one or more articles.

4,706,731

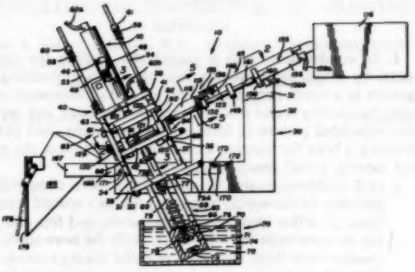
APPARATUS FOR MOLDING METALLIC ARTICLES

Robert Cornell, Cambridge, Ohio, assignor to 31, Inc., Newcomerstown, Ohio

Filed Jan. 27, 1986, Ser. No. 822,319

Int. Cl.[4] B22D *17/04, 19/00*

U.S. Cl. 164—317 **17 Claims**



1. Metal molding apparatus comprising:

a stanchion;

a pair of opposed, first and second support plates movable within said stanchion;

first and second mold sections carried, respectively, on said first and second support plates;

activating means supported from said stanchion to move said first support plate carrying said first mold section toward said opposed support plate carrying said second mold section to bring said mold sections into mating juxtaposition, the mating juxtaposition of said mold sections effecting a closure of the molds to form a cavity therebetween, said activating means operable to selectively move said first support plate away from said opposed, second support plate so as to open said mold sections;

an injection tube extending through said second mold sec-

tion and opening into the cavity formed when said mold sections are closed;

means to selectively pump molten metal through said injection tube and into said cavity having a displacement pump cylinder secured to said stanchion;

a displacement plunger movable axially within said cylinder;

a displacement plunger movable axially within said cylinder;

said injection tube being secured to said plunger;

a passage extending axially through said injection tube and communicating, through said plunger, to the pump cylinder;

a reservoir of molten metal available to said cylinder; and,

check valve means to permit the free flow of molten metal from said reservoir into said cylinder but to preclude reverse flow thereof.

4,706,732

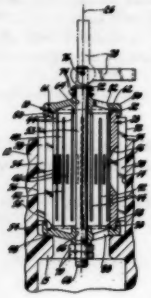
BORE CHILL FOR LOST FOAM CASTING PATTERN

Gerald K. Ruhlandt, Madison Heights, and Romuald Gmurowski, Mt. Clemens, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 891,993, Aug. 1, 1986, abandoned. This application Sep. 22, 1986, Ser. No. 909,713

Int. Cl.[4] B22D *15/00*

U.S. Cl. 164—353 **3 Claims**



1. In combination with a vaporizable pattern for casting metal by a lost foam process that comprises embedding the pattern in a vapor-permeable mold formed of unbonded particles and casting metal into the mold to vaporize and replace the embedded pattern to form a product casting, said pattern defining a bore for forming a corresponding bore in the product casting, a chill device comprising

a chill body receivable in said pattern bore comprising a plurality of outwardly extending fins in a spaced arrangement to define channels therebetween, said fins comprising an outermost tip for contact with the bore surface to conduct heat from replacement metal during casting, said channels communicating with the ambient mold for receiving metal-shaping mold material and venting vapors into the ambient mold.

4,706,733

CONTINUOUS CASTING MACHINE

Joseph Pietryka, Versailles, and Joel Cazaux, Chelles, both of France, assignors to Fives-Cail Babcock, Paris, France

Filed Jan. 15, 1987, Ser. No. 3,570

Claims priority, application France, Jan. 17, 1986, 86 00611

Int. Cl.[4] B22D *11/04, 11/124*

U.S. Cl. 164—416 **6 Claims**

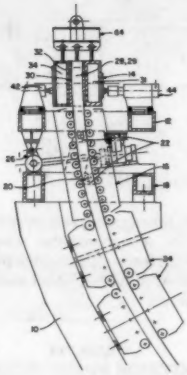
1. A continuous casting machine for producing slabs, which comprises

(a) an oscillating table constituted by a rectangular frame having large sides and small sides defining an opening,

(b) a mold carried by the oscillating table in alignment with said opening and consisting of two opposing large plates and two opposing small plates held tightly between the large plates,

(c) means for adjusting the position of the small plates with respect to the large plates,

(d) supports for the small plates integral with the position adjusting means,



(e) means for exerting a pressing force upon the large plates for pressing them tightly against the small plates,

(1) the large plates, the position adjusting means and the means for exerting the pressing force being mounted on the oscillating table, and

(f) a curved roll rack disposed below the oscillating table.

4,706,734

CONTINUOUS CASTING OF STRIPS OR BARS

Gus Sevastakis, 5645 Angola Rd., Toledo, Ohio 43615

Continuation of Ser. No. 703,907, Feb. 21, 1985, abandoned. This application Jun. 18, 1986, Ser. No. 876,303

Int. Cl.[4] B22D *11/124*

U.S. Cl. 164—443 **8 Claims**

1. A continuous strip casting apparatus comprising

a graphite die having rectangular long and short sides and an opening therethrough and having flat continuous planar outer contacting surfaces,

said opening having an elongated cross section including rectangular long sides and short sides,

said opening having an inlet end for the molten metal to enter the cavity and an outlet end for the solidified metal to exit the cavity,

a cooler body associated with the graphite die,

said cooler body comprising two U-shaped halves having a long side and short sides,

said short sides of each half of said cooler body extending toward one another along the short sides of the die into closely spaced adjacent relation having flat continuous planar inner contacting surfaces engaging the outer contacting surfaces of said graphite die such that said two halves substantially surround and support said graphite die with the contacting surfaces in heat exchange relationship,

means for holding the two halves of said cooler body in position surrounding and supporting the graphite die,

a plurality of axially extending passages entirely within each half of said cooler body in transversely spaced relation along each of the long sides of the elongated opening,

each axial passage extending from adjacent the outlet end of the graphite die axially toward the inlet end,

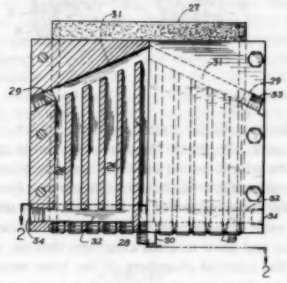
the ends of said axial passages adjacent the outlet end of said

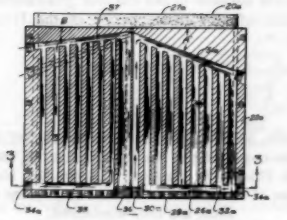
graphite die terminating substantially in a transverse plane,

the other ends of at least a portion of said axial passages lying in a plane forming an angle with the axis of the opening such that the length of the axial passages decreases progressively from the center of the die cavity toward the short end of the die,

a coolant inlet passage entirely within each half of said cooler body extending centrally of said cooler body and axially from adjacent the outlet end of the graphite die toward the inlet end of said graphite die such that coolant flows directly through said coolant inlet passage from adjacent the outlet end of the die to the inlet end,

a pair of transverse outlet passages entirely in each half of the cooler body intersecting the axially extending inlet passage and extending laterally outwardly from said cool-





ant inlet passage and said axial passages at the ends nearest the inlet to said graphite die such that coolant flows through said transverse passages and thereafter through said axial passages in direction away from the inlet end of the die to the outlet end of the die,

and transverse coolant outlet passages entirely within each half of the cooler body connecting the ends of said axial passages in each said half adjacent the outlet end of the graphite die,

said cooler body having outlets communicating with said transverse coolant passages adjacent the intersection of the transverse coolant passages with each outermost axial passage nearest the short side of the cooler die such that the coolant flows from the ends of said axial passages,

whereby the freezing line of the strip being cast comprises a substantially straight line transversely of said axis of said opening in said die.

4,706,735

CONTINUOUS CASTER INCLUDING AN ELECTROMAGNETIC STIRRING APPARATUS

Hisakazu Mizota, and Shinji Kojima, both of Okayama, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan

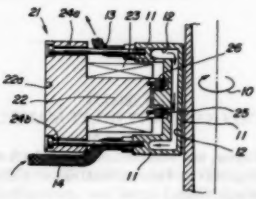
PCT No. PCT/JP83/00433, § 371 Date Apr. 11, 1984, § 102(e) Date Apr. 11, 1984, PCT Pub. No. WO85/02569, PCT Pub. Date Jun. 20, 1985

Continuation of Ser. No. 606,776, Apr. 11, 1984, abandoned. This PCT application Dec. 7, 1983, Ser. No. 14,097

Claims priority, application Japan, Jun. 8, 1982, 57-97972

Int. Cl.⁴ B22D *11/10, 11/124*

U.S. Cl. 164—504 **8 Claims**



1. A continuous caster comprising a mold and an electromagnetic stirring apparatus, the electromagnetic stirring apparatus comprising a plurality of guide plates arranged just beneath the mold so as to surround a cast strand containing an unsolidified molten metal therein, each of said plurality of guide plates being adjacent to a respective one of the sides of said cast strand and provided with a flow path for a cooling liquid, and a plurality of electromagnetic coils each integrally united with a respective core, said core being detachably attached at its front face to a respective one of said plurality of guide plates and integrally supported by a common member of a ring-like shape.

4,706,736

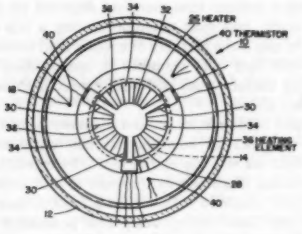
MULTI-ZONE HEATER ARRANGEMENT FOR CONTROLLING THE TEMPERATURE OF A FLOWING MEDIUM

Steven A. Gyori, Pomona, N.Y., assignor to Technicon Instruments Corporation, Tarrytown, N.Y.

Filed May 20, 1986, Ser. No. 865,365

Int. Cl.⁴ F25B *29/00*

U.S. Cl. 165—30 **17 Claims**



1. An arrangement for controlling the temperature of a gaseous medium being circulated through a sealed flow chamber; duct means in said flow chamber forming a passageway for said gaseous medium; a multi-zone heater being interposed in said passageway for separating the flow of said gaseous medium into a plurality of separate flows each passing through respectively one zone of said heater; thermal sensing means in said passageway downstream of said heater for sensing the temperature of each of said separate flows of said gaseous

medium exiting from each zone of said heater; and means for individually regulating the temperature in each said flow zone for selectively heating the flow of the gaseous medium passing through said zone to compensate for sensed temperature differentials in the gaseous medium flowing through said zones and to impart a uniform temperature over the cross-section of the flow of the gaseous medium circulating through said arrangement.

4,706,737

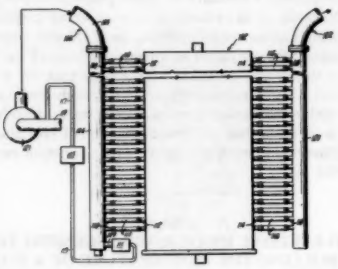
FUEL CELL COOLANT INLET MANIFOLD AND SYSTEM

William A. Taylor, and Martin L. Abrams, both of Glastonbury, Conn., assignors to International Fuel Cells Corporation, South Windsor, Conn.

Filed Nov. 20, 1986, Ser. No. 932,849

Int. Cl.[4] F28F *19/00*; H01M *8/24, 8/04, 8/12*

U.S. Cl. 165—47 2 Claims



1. An electrochemical cell cooling system of the type which uses a water coolant, said system comprising:

(a) a stack of electrochemical cells to be cooled, said stack including a plurality of cooling plates interspersed therethrough;

(b) a water coolant inlet manifold disposed on one side of said stack, said inlet manifold having a top end and a bottom end and a plurality of coolant feed snivvies extending from said inlet manifold to said cooling plates for feeding coolant from said inlet manifold to each of said cooling plates;

(c) a water coolant inlet conduit operably connected to said inlet manifold for admitting coolant water to said inlet manifold via said top end of said inlet manifold;

(d) a coolant bleed snivvy disposed at said bottom end of said inlet manifold below a lowermost of said feed snivvies, said bleed snivvy being thus positioned to be in a zone of said inlet manifold into which corrosion product particles will settle in said inlet manifold, and said bleed snivvy providing a constantly open passage through which settling corrosion product particles will exit from said inlet manifold;

(e) a bleed conduit operably connected to said bleed snivvy to duct corrosion product particles from said inlet manifold to a polisher wherein said particles will be removed from said water coolant; and

(f) means for returning said water coolant to a main stream of said cooling system after treatment in said polisher.

4,706,738

RADIATOR GRILL FOR MOTOR VEHICLES

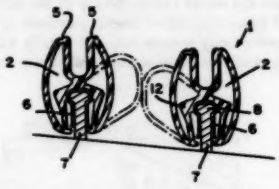
Klaus- J. Heimbrodt, Treuchtlingen; Götz Motting, Boblingen, and Albert Hack, Sindelfingen, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Sep. 25, 1986, Ser. No. 911,670

Claims priority, application Fed. Rep. of Germany, Sep. 24, 1985, 3533974

Int. Cl.[4] F01P *7/10*

U.S. Cl. 165—98 7 Claims



1. A radiator grill for motor vehicles which comprises a plurality of parallel oriented lamellae arranged at mutual intervals with free interstices between the lamellae being able to be closed by pressurizable flexible hose means as a function of the cooling water temperature of an internal combustion engine;

wherein each of adjacent hose means are fastened on the lamellae and have internal chambers therein; and

wherein the internal chambers of the hose means are connected to either negative or positive pressure sources as a function of the cooling water temperature; the improvement comprising that: the hose means exhibit an approximately H-shaped cross section in a normal unflexed condition; and

wherein there are approximately U-shaped downwardly opening clips for fastening the hose means to the plurality of parallel lamellae of the radiator grill connected to the underside of a crossbar portion of the H-shaped hose means.

4,706,739

HEAT EXCHANGER

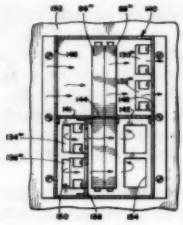
Don W. Noren, 846 Blandford Blvd., Redwood City, Calif. 94062

Continuation-in-part of Ser. No. 727,588, Apr. 26, 1985, Pat. No. 4,600,050. This application Jun. 11, 1986, Ser. No. 872,815

The portion of the term of this patent subsequent to Jul. 15, 2003, has been disclaimed.

Int. Cl.[4] F28D *15/00*

U.S. Cl. 165—104.14 17 Claims



1. A heat exchanger assembly for cooling the interior of a closed cabinet containing electronic components or the like, comprising:

a finned heat pipe core including:

a plurality of spaced, substantially parallel, heat pipe bodies, and

a plurality of spaced fins which are provided with colinear apertures through which each of said plurality of heat pipe bodies can extend, said plurality of heat pipes being secured to said plurality of fins such that each fin is in thermal contact with at least one of said plurality of heat pipes;

a second finned heat pipe core, said two cores being positioned in a side-by-side arrangement;

affixing means for securing said finned heat pipe cores to an associated closed cabinet; and,

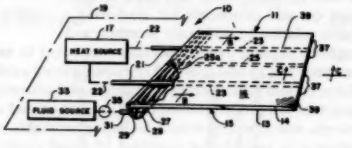
a pair of fans, one being operatively connected with each end of said finned heat pipe cores, one of said fans, and an associated first end of each of said heat pipe cores, being in contact with only the atmosphere inside said associated closed cabinet, the other of said fans and an associated second end of each of said finned heat pipe cores being in contact with only the ambient atmosphere outside said associated cabinet, and wherein said fins have a spacing and a thickness which is sized to fit the performance curve of said fans, wherein said fans each have a capacity of approximately 100 CFM (cubic feet per minute) and wherein said finned heat pipe cores are optimized for said fans such that approximately fourteen fins are provided per inch of heat pipe length with each of said fins being approximately 0.008 inches in thickness, whereby said finned heat pipe cores and said pair of fans are capable of transferring at least 200 watts of heat when the temperature inside said associated cabinet is approximately 20° C. above the ambient temperature.

4,706,740

VENTABLE SURVIVABLE HEAT PIPE VAPOR CHAMBER SPACECRAFT RADIATOR

Edward T. Mahefkey, Beavercreek, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 11, 1987, Ser. No. 24,489
Int. Cl.[4] F28D *15/02*
U.S. Cl. 165—104.14 **9 Claims**



1. A system for radiating heat generated by a source of heat aboard a spacecraft or the like, which comprises:

(a) a pair of heat pipes, each heat pipe having an evaporator end for thermally interfacing said source of heat and an elongated condensor end, the respective condensor ends of said heat pipes being disposed in spaced relationship to each other;

(b) a pair of spaced heat conducting wall members having first and second ends and being bonded to said heat pipes with said heat pipes therebetween, said wall members defining respective outer heat radiating surfaces and inner condensation surfaces, said condensation surfaces and said heat pipes defining therebetween a substantially closed vapor chamber of preselected size and configuration having an inlet at corresponding first ends of said wall members and an outlet at corresponding second ends of said wall members;

(c) a rewet artery, including capillary wicking material having first and second ends, disposed within said vapor chamber between said condensor ends of said heat pipes, said first end of said rewet artery communicating with said inlet of said vapor chamber;

(d) a source of liquid heat exchange medium operatively connected in liquid flow communication with said vapor chamber inlet;

(e) means on said condensation surfaces of said wall members for promoting condensation of vaporous heat exchange medium and for facilitating flow of condensed heat exchange medium generally toward said heat pipes; and

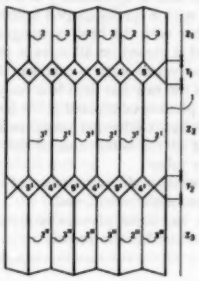
(f) a pressure relief valve disposed at said outlet of said vapor chamber for venting said vapor chamber when the pressure therein exceeds a preselected level.

4,706,741

HEAT EXCHANGER OF FALLING FILM TYPE

Ulf Bolmstedt, Staffanstorp, and Bengt Lundblad, Malmö, both of Sweden, assignors to Alfa-Laval Food & Dairy Engineering AB, Lund, Sweden

PCT No. PCT/SE85/00167, § 371 Date Nov. 29, 1985, § 102(e) Date Nov. 29, 1985, PCT Pub. No. WO85/04949, PCT Pub. Date Nov. 7, 1985
PCT Filed Apr. 10, 1985, Ser. No. 829,654
Claims priority, application Sweden, Apr. 18, 1984, 8402163
Int. Cl.[4] F28D *5/02*
U.S. Cl. 165—115 **8 Claims**



1. In a heat exchanger of the falling film type comprising heat exchange plates each having corrugations forming ridges and valleys, said plates being supported with their ridges and valleys extending vertically in the falling direction of the film, said corrugations having the effect of enlarging the surface area of the plate as compared to the surface area of a flat plate of the same size, the improvement in which each plate has a plurality of main zones located one after the other in the falling direction and extending transversely of said direction, each plate also having a transition zone between adjacent main zones, said ridges and valleys extending continuously within each of said main zones, the ridges and valleys in two adjacent main zones being displaced laterally in relation to each other to cause the ridges and valleys in one main zone to extend in longitudinal alignment with the valleys and ridges, respectively, in the adjacent main zone, the plate in said transition zone being devoid of and interrupting said ridges and valleys and forming connection surfaces for continuous liquid film flow from the lower ends of the ridges and valleys in one main zone of said plate to the upper ends of the valleys and ridges, respectively, in the next lower main zone of the plate.

4,706,742

RAW GAS/PURIFIED GAS HEAT EXCHANGER

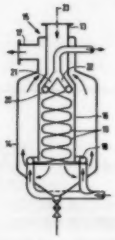
Winfried Ganzer, Erlangen, Fed. Rep. of Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mülheim/Ruhr, Fed. Rep. of Germany

Filed May 21, 1986, Ser. No. 865,990

Claims priority, application Fed. Rep. of Germany, May 24, 1985, 3518842

Int. Cl.[4] F28F 9/22; F28D 7/00

U.S. Cl. 165—119 2 Claims



1. Raw gas/purified gas heat exchanger for hot dust-laden raw gas, comprising:

(a) a substantially vertical channel which is open at the bottom

(b) a raw gas inlet line to the top of the channel for the introduction therein of hot dust-laden raw gas

(c) heat exchanger tubes through which purified gas flows disposed in the vertical channel with the tubes arranged in different two-dimensional planes extending parallel to each other and to a symmetry axis of the channel

(d) a vessel with a funnel-shaped bottom wherein the channel together with the heat exchanger tubes are arranged, said vessel is closed on all sides is provided at the upper end of the vessel with a raw gas discharge line which surrounds the raw gas inlet line concentrically

(e) an input plenum connected at the lower end of the channel to the heat exchanger tubes, and a discharge plenum connected at the other end of the channel to the heat exchanger tubes

(f) an ash discharge device connected to the lowest point of the bottom of the vessel, and

(g) wherein the input plenum is arranged exterior of the channel but within the vessel.

4,706,743

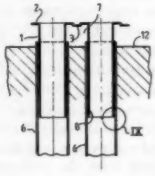
TUBE PLATES FOR HEAT EXCHANGERS

Max Chalimbaud, Plaisir, France, assignor to Societe Industrielle Pecquet, Tesson, France

Filed Jan. 13, 1986, Ser. No. 818,538

Int. Cl.[4] F28F 19/00

U.S. Cl. 165—134.1 7 Claims



1. In a tube plate for a heat exchanger having tubular pieces for protecting its face or the ends of its tubes, comprising a cylindrical sleeve with a bent back circular edge, or head, forming a collar, and positioned inside the end of said tubes or bores, the head of said protecting pieces has for an external contour a polygon whose sides, parallel in pairs, are perpendicular to the planes joining the axis of a tube, or bore, of the tube plate to which they are applied to the axes of the adjacent tubes or bores, the distance between the parallel sides being greater than that separating the adjacent axes situated in the plane to which these sides are perpendicular, and one of the sides having an offset flange, namely a a flange offset with respect to the plane of the head by a height substantially equal to the thickness of said head.

4,706,744

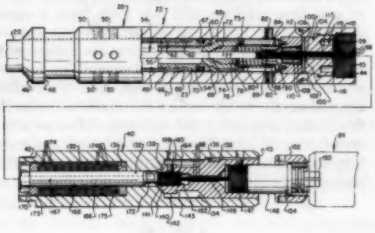
WIRELINE TOOL CONNECTOR

Lonnie J. Smith, Allen; Steven G. Petermann, and Dennis R. Wood, both of Plano, all of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Aug. 22, 1986, Ser. No. 899,443

Int. Cl.[4] E21B 47/00; F16L 27/12; H02G 9/06

U.S. Cl. 166—65.1 19 Claims



1. A connector for interconnecting a downhole tool adapted to be disposed in a wellbore with an elongated tubing string, said tubing string including an elongated signal transmitting cable extending therein for transmitting signals between said tool and the earth's surface, said connector comprising:

an elongated body member connected at one end to said tubing string, said body member including means forming a bore through which said cable extends;

means on said connector for anchoring a portion of said cable relative to said body member; and

frangible coupling means operably connected to said body member and to said tool and responsive to an axial pulling force on said tubing string to separate said connector from said tool at a predetermined force exerted on said coupling means, said coupling means including separable members adapted to provide for extension of signal conductors of said cable through said frangible coupling means to said tool.

4,706,745

LOCK-DOWN RELEASING SPEAR ASSEMBLY

Thomas R. Bishop; Wayne A. Kovar, and Clyde D. Roque, all of Houston, Tex., assignors to Bowen Tools, Inc., Houston, Tex.

Continuation of Ser. No. 784,596, Oct. 4, 1985, abandoned. This application Dec. 15, 1986, Ser. No. 941,617

Int. Cl.[4] E21B 31/20

U.S. Cl. 166—98 8 Claims

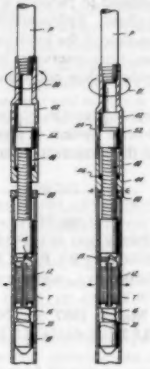
1. A lockdown releasing spear assembly for releasably engaging the inner walls of a tubular member when a supporting mandrel for the spear is pulled upwardly to apply tension to the spear, the improvement comprising:

means to releasably lock the spear under tension in the tubular member by releasably locking the mandrel in position relative to the tubular member after the spear has gripped the inner wall of the tubular member to prevent a release of the spear from its gripping contact with the inner wall of the tubular member when a load ranging from tension to compression is applied to the supporting mandrel;

said means for releasably locking the mandrel to the tubular

member including a transfer assembly operatively connected to the mandrel and adapted to abut the end of the tubular member after the spear is in gripping engagement with the tubular member;

said transfer assembly including means to prevent separation



of said mandrel from operative connection to said transfer assembly; and

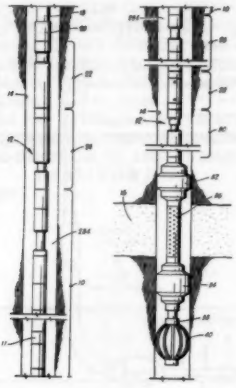
said means to prevent separation including a retaining cap on said mandrel positioned within a cavity in said transfer assembly above the operative connection between said transfer assembly and said mandrel.

4,706,746

DOWNHOLE INFLATABLE PACKER PUMP AND TESTING APPARATUS

Kevin M. White, Jupiter, Fla., and Harold K. Beck, Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Oct. 27, 1986, Ser. No. 924,250
Int. Cl.[4] E21B *33/124, 43/12*
U.S. Cl. 166—106 **18 Claims**



1. A downhole pump comprising:

case means attachable to a lower testing string portion and defining a pumping chamber therein;

mandrel means connectable to an upper testing string portion for mutual rotation therewith and rotatable within said case means, said mandrel means comprising cam means thereon and said case means and said mandrel means defining a piston chamber therebetween;

piston means disposed in said piston chamber and having cam follower means thereon for following said cam means and reciprocating said piston means with respect to said case means in response to rotation of said mandrel means with respect to said case means;

diaphragm means sealingly positioned between said piston chamber and said pumping chamber and preventing fluid communication therebetween, whereby fluid movement in said pumping chamber is responsive to fluid movement in said piston chamber and;

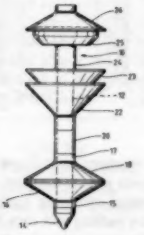
pressure equalizing means for equalizing a hydrostatic fluid pressure in said pumping chamber with a hydrostatic fluid pressure in said piston chamber.

4,706,747

CEMENTING PLUG

David E. Schneider, Houston, Tex., assignor to Weatherford U.S., Inc., Houston, Tex.

Filed Nov. 25, 1985, Ser. No. 801,521
Int. Cl.[4] E21B *33/16*
U.S. Cl. 166—153 **3 Claims**



3. A plug for use in wellbore operations, the plug comprising

shaft means having a first end and a second end,

first hollow cup-shaped conical wiper means mounted on the shaft means with its apex pointed in the direction of the first end of the shaft means,

second hollow cup-shaped conical wiper means disposed on the shaft means, the second conical wiper means inverted with respect to the first conical wiper means and the second hollow conical wiper means with its apex pointed away from the apex of the first hollow conical wiper means, and

the outer edges of the first and second conical wiper means are in contact.

4,706,748

PIPE SCRAPING DEVICE

Kim A. Harris, Casper, Wyo., assignor to IMD Corporation, Denver, Colo.

Filed Sep. 10, 1986, Ser. No. 905,844
Int. Cl.[4] E21B *37/02*
U.S. Cl. 166—173 **5 Claims**

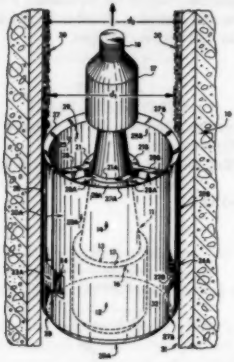
1. A pipe scraping device comprising:

a mandrel having a mandrel base to which a cam is mounted, said cam having a generally conical configuration which tapers from a base, mounted upon the mandrel base, to a top which includes a means for connecting the mandrel to a source of power capable of pulling the device through a pipe;

a plurality of scraper elements which, when associated in a first position, form an annular, tube-like outer wall capable of being inserted into the pipe, and which, when annularly expanded to a second position, form a split, tube-like outer wall which scrapes foreign material from the inside of the pipe, and wherein each scraper element comprises:

an outer wall segment which, when the plurality of scraper elements are in the first position, forms a segment of the tube-like outer wall and which, when the plurality of scraper elements are in the second position serve to scrape foreign material from the inside of the pipe;

at least one rib element which holds the outer wall segment in a fixed concentric relationship to an inner wall segment and thereby define a cavity between the outer wall segment and the inner wall segment through which scraped foreign material may pass;



an inner wall segment which, when the plurality of scraper elements are in the first position forms a segment of a conical camming surface against which the cam is urged by pulling said cam higher into the conical camming surface and thereby splitting and annularly expanding the conical camming surface which in turn expands the outer wall segment to its second, foreign material scraping, position;

means for holding the scraper elements in an expandable, annular configuration; and

means for limiting movement of the mandrel higher into the conical camming surface.

4,706,749

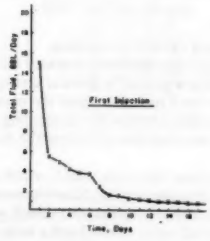
METHOD FOR IMPROVED OIL RECOVERY

Michael E. Hayes, Fernandina Beach; Gary R. Hass, Amelia Island; Robert Sharpe, Fernandina Beach, all of Fla.; Eirik Nestaas, Chestnut Hill, and Mikhail V. Ostrovsky, Acton, both of Mass., assignors to Petroleum Fermentations N.V., Willemstad, Netherlands Antilles

Filed Nov. 6, 1984, Ser. No. 668,783

Int. Cl.[4] E21B *43/22, 43/34*

U.S. Cl. 166—267 **22 Claims**



1. A non-thermal, single-well method for improved oil recovery from a hydrocarbon-bearing reservoir with essentially no natural drive in which:

(a) a volume of a chemical surfactant/cosurfactant/brine mixture, greater than a volume required to fill the well bore and immediate vicinity thereo into a well penetrating the reservoir, which surfactant/cosurfactant/brine mixture is preformulated to produce a stable, low interfacial tension, three-phase, hydrocarbon-microemulsion-brine system with a sample of the hydrocarbon of the reservoir;

(b) a subterranean, intra-reservoir, low interfacial tension, three-phase, hydrocarbon-microemulsion-brine system is formed; and

(c) the low interfacial tension, three-phase, hydrocarbon-microemulsion-brine system is produced from the same well into which the surfactant/cosurfactant/brine mixture is injected.

4,706,750

METHOD OF IMPROVING CO_2 FOAM ENHANCED OIL RECOVERY PROCESS

John J. Buckles, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Mar. 6, 1987, Ser. No. 23,073

Int. Cl.[4] E21B *43/24, 43/26, 43/263*

U.S. Cl. 166—271 **19 Claims**

1. A method for recovering oil from a subterranean oil-containing formation penetrated by at least one injection well and at least one spaced-apart production well comprising

(a) forming a plurality of horizontal fractures extending radially around and near said injection well;

(b) injecting into said injection well a mixture of CO_2 and a foaming agent; and

(c) recovering fluids including oil from the formation via the production well.

4,706,751

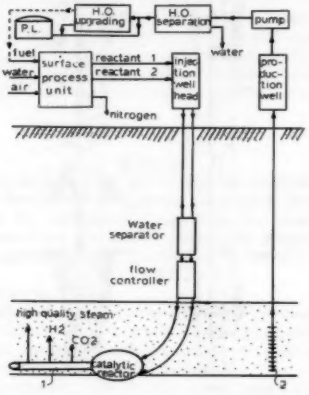
HEAVY OIL RECOVERY PROCESS

Michel Gondouin, San Rafael, Calif., assignor to S-Cal Research Corp., San Rafael, Calif.

Filed Jan. 31, 1986, Ser. No. 824,521

Int. Cl.[4] E21B *43/24, 43/30, 43/40*

U.S. Cl. 166—272 **14 Claims**



1. A process for the recovery of heavy oil from reservoirs deeper than 1,000 feet wherein surface facilities produce various chemical reactants, in gaseous form, and water for feeding into an injection well and for transferring said reactants via feeder tubings to a downhole reactor where, in the presence of a suitable catalyst, a reversible exothermic reaction takes place,

converting said reactants and water into a gaseous mixture containing Hydrogen and high quality steam at a temperature such that, at the pressure required for injection of said mixture into the reservoir, hydrogenation of the heavy oil is initiated and proceeds at a rate sufficient to approach equilibrium within the duration of oil production from the reservoir drainage area associated with said injection well; said gaseous mixture exiting at high pressure from said downhole reactor, where both Hydrogen and steam are in direct contact with said catalyst, is then injected into the reservoir, contacts the heavy oil over a large area and, through hydrogenation and viscosity-reduction of said heavy oil, forms around said injection well a mobile oil bank which grows in time and ultimately flows into the surrounding production wells.

4,706,752

METHOD FOR FOAM EMPLACEMENT IN CARBON DIOXIDE ENHANCED RECOVERY

LeRoy W. Holm, Fullerton, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed Dec. 3, 1984, Ser. No. 677,182
Int. Cl.[4] E21B *43/22*
U.S. Cl. 166—273 **54 Claims**

1. A method for reducing the permeability of higher permeability zones of an oil bearing subterranean reservoir having heterogeneous permeability and being penetrated by at least one well, said method comprising:

(1) injecting through a well and into said reservoir:

(a) an aqueous liquid solution of a water soluble surface active agent;

(b) a foam emplacement gas mixture consisting essentially of carbon dioxide and a crude oil-insoluble, noncondensible, non-hydrocarbon gas, the injection being under conditions such that the gas mixture maintains a density between 0.01 and 0.42 grams per centimeter in the reservoir;

(2) allowing stable foam to form in said higher permeability zones;

(3) diverting subsequently injected gases into lower permeability zones of the reservoir without destroying the stable foam; and

(4) producing oil from said reservoir.

4,706,753

METHOD AND DEVICE FOR CONVEYING CHEMICALS THROUGH BOREHOLE

Katsutoshi Ohkochi; Mamoru Shinozaki, both of Funabashi; Toshiyuki Ohshita, Hirakata; Masayasu Kitano, Kashihara, and Seizo Kamata, Fukuoka, all of Japan, assignors to Takanaka Komuten Co., Ltd, Japan

Filed Nov. 4, 1986, Ser. No. 926,675
Claims priority, application Japan, Apr. 26, 1986, 61-97563; Apr. 30, 1986, 61-100525; Jul. 14, 1986, 61-165396
Int. Cl.[4] E21B *33/13*
U.S. Cl. 166—286 **13 Claims**

1. A method of conveying chemicals, comprising the steps of:

preparing a capsule which comprises a cylinder and has a bottom plate at its lower end, the capsule being charged with chemicals, the bottom plate being made from a fragile material such as glass, ceramic, or reinforced cloth;

suspending a weight above the cylinder by a cord, the weight being used for destroying the bottom plate;

fastening the cord such that the cord extends over knife edges protruding from a cutting base that is rigidly fixed to a wire line from which the cylinder is suspended;

letting down the capsule to a desired location in a borehole;

slidably attaching a weighted object for cutting the cord to the wire line;

letting the weighted object slide down the wire line causing the cord to be cut by the knife edges, thereby causing the weight to act on the bottom plate to diffuse the chemicals contained in the capsule.

2. A capsule for conveying chemicals through a borehole, comprising:

a hollow cylinder whose inside has an enlarged portion at the lower end;

a bottom plate made from a fragile material such as glass, ceramic, or reinforced cloth, the bottom plate being mounted to the enlarged portion of the cylinder via a short threaded cylinder member;

a weight suspended by a cord above the cylinder, the weight being used for destroying the bottom plate;

a cutting base rigidly fixed to a wire line by which the cylinder is suspended;

knife edges protruding from the cutting base, the cord being fastened so as to extend above the knife edges; and

means for causing the cord to be pressed against the knife edges, thereby cutting the cord.

4,706,754

OIL RECOVERY PROCESS USING A DELAYED POLYMER GEL

Ronald E. Smith, Littleton, Colo., assignor to Marathon Oil Company, Findlay, Ohio

Filed Mar. 14, 1986, Ser. No. 840,122
Int. Cl.[4] E21B *33/138*
U.S. Cl. 166—295 **28 Claims**

1. A process for substantially reducing the permeability of a high permeability region in a hydrocarbon-bearing formation below an earthern surface penetrated by a wellbore in fluid communication with said region, the process comprising:

preparing an aqueous gelation solution at the surface consisting essentially of a crosslinkable polymer, a carboxylic acid, an aqueous solvent, and a complex capable of crosslinking said polymer and formed of at least one electropositive chromium III species and at least one electronegative acetate species;

injecting said gelation solution into said formation via said wellbore;

displacing said gelation solution into said high permeability region; and

substantially gelling said solution in said region to substantially reduce the permeability of said region.

4,706,755

FLUID LOSS CONTROL IN WELL CEMENT SLURRIES

David N. Roark; Adam Nugent, Jr., and Baldev K. Bandlish, all of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Division of Ser. No. 945,432, Dec. 22, 1986, which is a division of Ser. No. 779,140, Sep. 23, 1985, Pat. No. 4,095,993, which is a continuation-in-part of Ser. No. 732,096, May 9, 1985, abandoned. This application Apr. 1, 1987, Ser. No. 32,635
Int. Cl.[4] E21B *33/13*
U.S. Cl. 166—295 **16 Claims**

1. In a process of cementing subterranean well formations employing an aqueous well cement slurry, the improvement characterized in that the slurry contains a gelatinous material that tends to plug porous zones and minimize premature water loss from the well cement slurry when present in the subterra-

nean well formation, said gelatinous material being formed by interaction in the presence of water between (i) a sulfonated polymer and (ii) a polymer of monoallylamine.

4,706,756

SUBSEA TOOL LAUNCHING EQUIPMENT

Alan J. Dean, Skene, and Ian J. Hardy, Banchory, both of Scotland, assignors to British Petroleum Company p.l.c., London, England

Filed Apr. 4, 1986, Ser. No. 848,128

Claims priority, application United Kingdom, Apr. 11, 1985, 8509287

Int. Cl.[4] E21B *23/08, 33/076*

U.S. Cl. 166—344 **6 Claims**

1. A subsea pumpdown tool launcher comprising, in sequence: a first valve for the entry and exit of a pumpdown tool from and to a subsea location, the bottom of said first valve being connected to the top of an upper connection for a pumpdown fluid circulation line, said connection being connectable to a pump, the bottom of the upper connection being connected to the top of an unrestricted riser section adapted to receive a pumpdown tool, the bottom of the unrestricted riser section being connected to the top of a second valve for the exit and entry of a pumpdown tool to and and from a subsea wellhead, the bottom of said second valve being connected to the top of a lower connection for the pumpdown fluid circulation line, said connection being connectable to a pump, the bottom of the lower connection being connected to the top of a subsea wellhead connection.

4,706,757

WELLHEAD SUPPORTED SUBSEA TEMPLATES AND METHODS

John P. Harrington, Houston, Tex., assignor to Amoco Corporation, Chicago, Ill.

Continuation of Ser. No. 736,597, May 21, 1985, abandoned. This application Aug. 13, 1986, Ser. No. 896,555

Int. Cl.[4] E21B *33/038*

U.S. Cl. 166—349 **12 Claims**

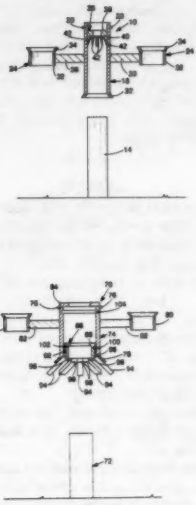
4. A method of installing a wellhead supported subsea template adjacent to the floor of a body of water, comprising the steps of:

positioning said template on an existing wellhead whereby said template is supported thereby adjacent to and above the floor of said body of water; and

causing said template to engage said wellhead so that said template is prevented from rotating relative to said wellhead by embedding at least one blade member attached within a central support member of said template into an upper portion of said wellhead when said central support member is contacted therewith.

10. A method of installing a wellhead supported subsea template having a central support member adjacent to the floor of a body of water, comprising the steps of:

positioning said template on an existing wellhead whereby said template is supported thereby adjacent to and above the floor of said body of water; and



lowering said template onto said wellhead and slidably moving an inner sleeve upwardly within a central bore of said central support member thereby causing a plurality of engagement tongs pivotally mounted to said inner sleeve to close about the outer surface of said wellhead.

4,706,758

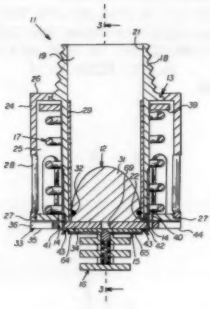
AUTOMATIC ON-OFF SPRINKLER HEAD

Wilfred V. Johnson, Oxford, Mass., assignor to U.S. Fire Control Corporation, Mass.

Continuation-in-part of Ser. No. 605,201, Aug. 30, 1984, abandoned. This application May 15, 1986, Ser. No. 863,490

Int. Cl.[4] A62C *37/06*

U.S. Cl. 169—19 **18 Claims**



1. An automatic on-off sprinkler head comprising:

a housing defining inlet and outlet openings;

valve means retained by said housing and disposed between said inlet and outlet openings, said valve means being movable between a closed position in which it prevents

fluid flow between said inlet and outlet openings and an open position in which it allows fluid flow therebetween;

temperature responsive shape-memory alloy actuator means shaped and arranged to allow movement of said valve means into said open position in response to ambient temperatures above a given level and to forcibly return said valve means into said closed position in response to ambient temperatures below said given level

latch means normally latching said valve means in said closed position, releasable to allow movement thereof to said open position, and shaped and arranged to automatically relatch said valve means in response to return thereof to said closed position;

release means operable to release said latch means and allow movement of said valve means into said open position; and

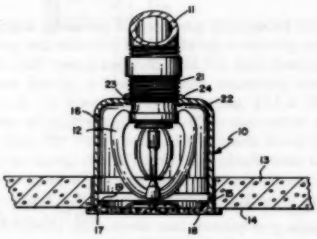
sensor means for operating said release menas in response to a predetermined ambient temperature.

4,706,759

SPRINKLER ASSEMBLY

John J. Grasseschi, 1299 Grafton St., Worcester, Mass. 01604

Filed Jul. 11, 1986, Ser. No. 884,358
Int. Cl.[4] A62C *25/00, 37/08;* E04B *1/00*
U.S. Cl. 169—51 **6 Claims**



1. Sprinkler assembly, comprising:

(a) a water distribution pipe,

(b) a sprinkler head having an operating mechanism, the head being operatively connected to the pipe and operative when exposed to a preselected temperature,

(c) a ceiling tile underlying the sprinkler head and having a lower surface below the lowest point of the sprinkler head and having an aperture in which the lowest point of the sprinkler head lies,

(d) a tubular casing surrounding the sprinkler head and suspended therefrom but independent of the operating mechanism thereof, so that a lower edge of the casing lies substantially in the plane of the said lower surface of the tile, wherein the aperture and the cross-section of the casing are both circular and of approximately the same size, and

(e) a cover plate having a flat upper surface lying against the lower surface of the tile and completely covering the said aperture, wherein the cover plate is a relatively thin circular disk of larger diameter than the aperture and has an exposed lower surface that is completely flat, the cover plate having an upwardly-extending integral abutment that extends snugly into the lower end of the casing to hold the cover plate securely in position,

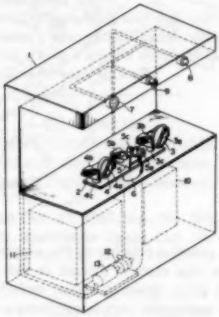
wherein the cover plate is formed of a polymer material that softens at a temperature substantially below the said preselected temperature, and wherein the interior of the lower end of the casing and the abutment on the cover plate both have cylindrical surfaces of approximately the same size.

4,706,760

FIRE EXTINGUISHING CONDITION MONITORING APPARATUS FOR AUTOMATIC FIRE EXTINGUISHING EQUIPMENT

Yoshio Arai, Sagamihara; Akira Kitajima, and Kouji Akiba, both of Yokohama, all of Japan, assignors to Hochiki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 19, 1985, Ser. No. 810,979
Claims priority, application Japan, Dec. 25, 1984, 59-275141
Int. Cl.[4] A62C *37/00*
U.S. Cl. 169—61 **3 Claims**



1. Apparatus for monitoring the fire extinguishing condition produced by automatic fire extinguishing equipment which detects flames due to a fire and sprays a fire extinguisher liquid from a nozzle to extinguish the flames, such monitoring apparatus comprising:

a detector for generating a signal corresponding to the light energy radiated by the flame;

a fire determination circuit including means for determining the fire extinguishing condition based on the signal from said detector;

said fire determination circuit comprising a portion which detects a DC component of the detector signal which corresponds to flicker in the light energy emitted by the flame and a portion which detects an AC component of such signal which corresponds to flicker in the light energy emitted by the flame and determining that the fire extinguisher liquid is hitting the flames when the detector signal has a DC component but has no AC component after spraying of the fire extinguishing liquid.

4,706,761

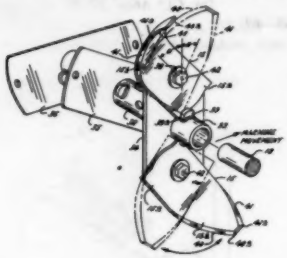
TILLING MACHINE WITH PIVOTAL BI-DIRECTIONAL OPERATIVE TINES

Lee R. Herscher, Kankakee, and Gerold G. Goertzen, St. Anne, both of Ill., assignors to Roper Corporation, Kankakee, Ill.

Filed Jan. 31, 1985, Ser. No. 696,725
Int. Cl.[4] A01B *33/14*
U.S. Cl. 172—42 **25 Claims**

1. A soil tilling machine having a tine drive shaft, and drive means for rotating the tine shaft in both a clockwise direction and a counterclockwise direction, the improvement comprising tine support means mounted on and rotatable with the tine shaft, a plurality of tines pivotally mounted on the tine support means, said tine support means comprising a mounting plate for each tine extending radially outwardly from said tine shaft, said tines each comprising a mounting end and a ground engaging end, means pivotably supporting the mounting end of each tine on one side of its respective mounting plate with one side of the mounting end in adjacent relation to the mounting plate and the other side thereof substantially exposed, said ground engaging end of each tine having first and second cutting edges on opposite sides thereof, said first cutting edge of each tine

being operable for engaging the ground when the shaft is rotated in the clockwise direction, said second cutting edge of each tine being operable to engage the ground when the shaft is rotated in the counterclockwise direction, pivot limiting means associated with each tine for positioning the tine in a first predetermined pivotal position relative to the support means and tine shaft when the tine shaft is rotated in the clockwise direction and for positioning the tine in a second predetermined pivotal position relative to the support means and tine shaft when the tine shaft is rotated in the counterclockwise direction, said pivot limiting means including stop surfaces formed on an innermost peripheral portion of the mounting end of each tine which respectively come into abutting relation with said tine shaft when each tine is in said first and second pivotal positions, and said tine each being formed with an arcuate portion disposed between said stop surfaces.



4,706,762

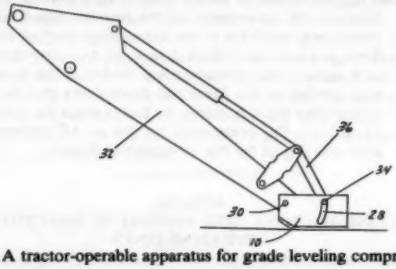
GRADE LEVELING DEVICE

John R. Harms, and Ronald L. Anderson, both of Burlington, Iowa, assignors to J. I. Case Company, Racine, Wis.

Filed Feb. 21, 1986, Ser. No. 831,632

Int. Cl.[4] E02F *3/815*; E01C *19/22*

U.S. Cl. 172—684.5 **2 Claims**



1. A tractor-operable apparatus for grade leveling comprising:

tractor boom and tilt arms extending to first and second tool-mounting ends, repectively, which have first and second horizontal mounting pins, respectively; and

a ground-engaging device attached to both of said tool-mounting ends and including:

a lower member having an uninterrupted flat bottom surface with an upwardly-beveled leading edge beneath said arms,

a pair of laterally spaced upright members rigidly affixed to and extending upwardly from the lower member,

a pair of aligned circular apertures in the upright members, the first horizontal mounting pin extending therein for pivotable attachment of the boom arm to the upright members about a fixed axis, and

the upright members including a pair of parallel arcuate slots centered about the fixed axis, the second horizontal mounting pin extending freely therein for slidable and pivotable attachment of the tilt arm to the upright members along the slots,

whereby the ground-engaging device is free to float about the fist pivot axis to accommodate both changes in its position of extension from the tractor on the tractor arms and changes in the grade during movement over the grade toward the tractor without reorientation steps by the operator.

4,706,763

RAPPING MECHANISM FOR AN ELECTROSTATIC PRECIPITATOR

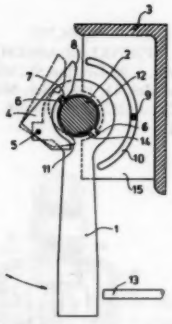
Erik M. Bojsen, Copenhagen, Denmark, assignor to F. L. Smidth & Co. A/S, Denmark

Filed Feb. 20, 1986, Ser. No. 831,357

Claims priority, application United Kingdom, Feb. 22, 1985, 8504614

Int. Cl.[4] B03C *3/76*

U.S. Cl. 173—100 **5 Claims**



1. A rapping mechanism for rapping the electrodes of an electrostatic precipitator, said mechanism, comprising:

at least one hammer which is adapted to be swung up from a rest position by a rotating shaft and then released so as to fall back to a hitting position in which the kinetic energy of said hammer is transferred to at least one rapping bar and hence to said precipitator electrodes, said hammer being suspended from, and freely swingable on, said shaft which carries a driver member for said hammer, said driver member having a path of rotation upon rotation of said shaft; wherein a latch is pivotally mounted on said hammer for movement between positions in which an engagement surface of said latch is clear of, and is in, said path of rotation of said driver member; and

a stationary release member located such that as said shaft rotates repeatedly, said driver member engages said latch engagement surface and hence picks up said hammer which is thus caused to swing up from a rest position until said latch reaches said release member which moves said latch out of engagement with said driver member, allowing said hammer to swing down again under gravity so as to hit said rapping bar and then to settle in said rest position.

4,706,764

TWO PIECE DOWN HOLE DRILL CHUCK

Robert W. Hughes, Easton, Pa., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Aug. 1, 1986, Ser. No. 891,560

Int. Cl.[4] E21B *17/10, 10/36*

U.S. Cl. 175—320 **3 Claims**

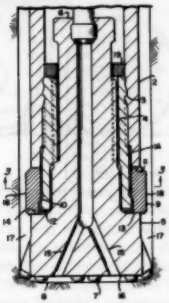
1. A two piece drill chuck for a downhole drill of the type comprising:

a cylindrical casing supported on a drill string for driving support therefrom;

a drill bit partly surrounded by the extending downwardly from said casing, said drill bit being of the type where drilling fluid is supplied through a central bore in said drill bit and exits the drill bit and drill hole about the peripheral outside surface of said drill bit and said casing;

the improvement comprising:

a mounting chuck means of hollow cylindrical form for securing said drill bit to a downhole drill;



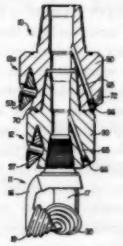
said chuck mounting means being interspaced between said casing and said drill bit and being in driving engagement with said casing and said drill bit, said mounting chuck means having a lower portion extending downwardly beyond the lower end of the casing; and a chuck wear collar of hollow cylindrical form concentric about and covering the entire otherwise exposed lower portion of said mounting chuck means, said chuck wear collar having an upwardly facing surface in engagement with said casing and a downwardly facing surface in engagement with the drill bit.

4,706,765

DRILL BIT ASSEMBLY

Ernie J. Lee, Lafayette, and William L. Thornton, Carencro, both of La., assignors to Four E Inc., Lafayette, La.

Filed Aug. 11, 1986, Ser. No. 895,669
Int. Cl.[4] E21B *10/26*
U.S. Cl. 175—334 **28 Claims**



1. A drill bit assembly comprising:

a pilot bit comprising:

a bit body having two legs radially positioned 120° apart thereon and depending from the lower surface thereof, said lower surface of said bit body away from said legs being beveled to reduce the effective area of said lower surface;

a cutter cone rotatably mounted on each of said legs and extending inward and downward whereby the inner tip of each cone lies on the centerline of said body;

each of said cones having a plurality of smooth circular cutting knife edges spaced along the surface thereof whereby said cutting edges on one of said cones will track between the pathes defined by said cutting edges on the other of said cones when said bit is rotated during drilling operation to thereby cut all of the bottom area of the hole to be drilled;

a first reamer section comprising:

a reamer body connected to the upper end of said pilot bit;

two disk cutters; and

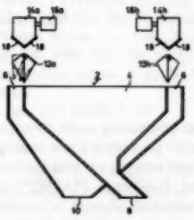
means for rotatable mounting said disk cutters on said body at points radially spaced 120° from each other and positioned to drill a hole having a diameter larger than that of the hole drilled by said pilot bit.

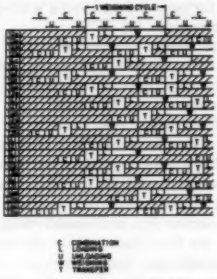
4,706,766

COMBINATION WEIGHING METHOD

Shoji Yamano, Akashi, and Isao Miyamoto, Himeji, both of Japan, assignors to Yamato Scale Company, Limited, Akashi, Japan

Filed Oct. 17, 1985, Ser. No. 788,388
Claims priority, application Japan, Oct. 26, 1984, 59-226473
Int. Cl.[4] G01G *19/22*
U.S. Cl. 177—1 **19 Claims**





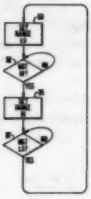
1. A combination weighing method comprising a transfer step for transferring product to empty ones of a plurality of auxiliary hoppers arranged to receive product from a plurality of weighing hoppers respectively, from those weighing hoppers corresponding to said empty auxiliary hoppers; a loading/weighing step for feeding product to said weighing hoppers having emptied by transferring the product to said empty auxiliary hoppers, and weighing the same; and a combination/unloading step effected in parallel with said transfer step and said loading/weighing step for repeatedly combining in various fashion the weights of said product having been transferred to said auxiliary hoppers and selecting from the resultant combinations a combination whose sum weight is equal or approximate to a predetermined weight, and unloading the hoppers of the selected combination.

4,706,767

DUAL-RANGE ANALOG-TO-DIGITAL CONVERTOR

Jau-Yi Chou, Fremont, Calif., assignor to f.m.e. Corporation, Hayward, Calif.

Filed Nov. 26, 1986, Ser. No. 935,660
Int. Cl.[4] G01G 19/52, 23/14
U.S. Cl. 177—50 5 Claims



1. An electronic computing scale comprising:

load cell means for providing a raw analog voltage representative of weight bearing on said load cell means;

analog-to-digital convertor ("ADC") means, having an ADC input terminal adapted to receive an analog input voltage, for providing a digital ADC output signal representative of the input voltage at said ADC input terminal, said ADC means operating to provide unique digital output signals for input voltages lying within a predetermined permissible range;

first transform means, responsive to the raw voltage, for providing a first transformed voltage lying within a first voltage sub-range contained within said permissible range when the weight is in a low sub-range;

second transform means, responsive to the raw voltage, for providing a second transformed voltage lying within a second voltage sub-range contained within said permissible range when the weight is in a high sub-range;

said first and second transformed voltages being characterized by respective first and second variations as a function of weight, the first characteristic variation exceeding the second characteristic variation;

a range flag having at least first and second states;

switch means, responsive to the state of said range flag, for applying said first transformed voltage to said ADC input terminal when said range flag is in its first state and said second transformed voltage to said ADC input terminal when said range flag is in its second state; and

logic means, responsive to said ADC output signal and to the state of said range flag, for controlling said range flag so that

if said range flag is in its first state and said ADC output signal corresponds to an input voltage outside said first voltage sub-range, said range flag is set to its second state, and

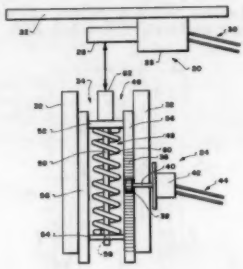
if said range flag is in its second state and said ADC output signal corresponds to an input voltage outside said second voltage sub-range, said range flag is set to its first state.

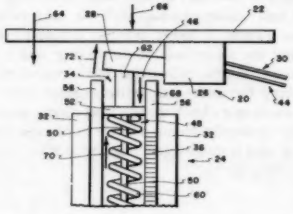
4,706,768

ONBOARD TRUCK SCALE

Gagik Kozozian, 8321 Faust Ave., Canoga Park, Calif. 91304, and Kris A. Mardian, 5619 Royer Ave., Woodland Hills, Calif. 91367

Filed Mar. 3, 1986, Ser. No. 835,631
Int. Cl.[4] G01G 19/08, 19/02
U.S. Cl. 177—138 13 Claims





1. An on-board scale for use on trucks and the like to measure movement between a frame supported above an axle by a compressible suspension system to calculate the load weight being carried by the frame, said scale comprising:

(a) a sensing member including first means for mounting said sensing member along an axis to the frame and including a load cell for producing at an output thereof a range of electrical signals proportional to a range of load weight force applied to an input surface thereof;

(b) a contacting member including second means for mounting said contacting member to the axle, said contacting member including a movable member adapted for movement along said axis into a first weighing position in contact with said input surface of said load cell at no load weight on the truck whereby as the load weight on the truck is increased the frame moves toward the axle compressing the suspension system and applying a force by said contacting member on the input surface directly proportional to the load and into a second driving position in which the contacting member is not in contact with the input surface; and

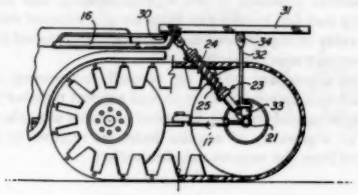
(c) proportional bias means including a compression spring provided in either of said first or second mounting means for absorbing a portion of the load force applied by the contacting member to the input surface whereby a force proportional to the load force is applied against said input surface as the truck is loaded to cause the frame to move towards the axle whereby said electrical signal is directly proportional to the load of the truck.

4,706,769

CONVERSION UNIT FOR ALL TERRAIN VEHICLES

Guy Latourelle, R. R. #1, Gracefield, Quebec, and Jean-Claude Gauthier, 1950 3rd Avenue, Val Dor, Quebec, both of Canada

Filed Jan. 10, 1986, Ser. No. 817,612
Claims priority, application Canada, Jul. 5, 1985, 486369
Int. Cl.[4] B62D *55/04*
U.S. Cl. 180—9.21 6 Claims



1. A conversion unit for attachment to a powered vehicle of the type comprising a pair of driven rear wheels and a vehicle frame for supporting the rear wheels, comprising:

auxiliary frame means for pivotable and detachable attachment to a lower portion of the vehicle between the driven rear wheels, the auxiliary frame means including an axle and auxiliary wheels rotatably mounted on the axle, one on each side of the frame;

load-carrying means detachably attachable to an upper part of the rear of the vehicle for pivotable movement about an axis extending transversely of the vehicle;

support means pivotably attached to the load-carrying meanas for pivotable movement about an axis extending transversely of the vehicle;

the lower end of the support means being secured to the auxiliary frame means rearward of the attachment to the vehicle;

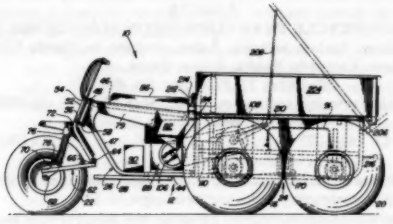
the unit defining with the vehicle a four-part linkage comprising the vehicle, the load carrying means, the support means and the auxiliary frame means, whereby a load placed on the load-carrying means is supported in part by the vehicle and in part by the auxiliary wheels.

4,706,770

UTILITY HAULING VEHICLE HAVING FOUR WHEEL DRIVE

Merlin E. Simon, Cascade, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Apr. 21, 1986, Ser. No. 854,213
Int. Cl.[4] B62D *61/10*; B60K *17/342*
U.S. Cl. 180—24.02 28 Claims



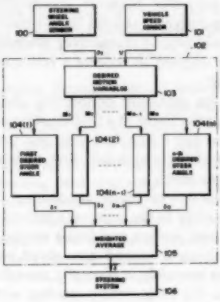
1. A four wheel drive vehicle comprising: a support frame; a prime mover mounted on the frame; first and second drive axle means rotatably mounted to the frame; said first drive axle means being divided into separate first and second axle sections and said second drive axle means being divided into separate third and fourth axle sections; four ground wheels respectively being mounted to said first, second, third and fourth axle sections; a drive train means coupled to the prime mover and including differential means coupled to the first and second axle sections for permitting differential rotation therebetween; said drive train means further including a first drive means coupled between the first and third axle sections for causing them to be driven in unison and a second drive means coupled between the second and fourth axle sections for causing them to be driven in unison; and a differential lock means coupled between the third and fourth axle sections and including a moveable connector means for selectively establishing a normally unlocked condition wherein the third and fourth axle sections may rotate differentially and a locked condition wherein the third and fourth axle sections and hence the first and second axle sections are caused to rotate in unison.

4,706,771

VEHICLE STEERING CONTROL SYSTEM USING DESIRED VEHICLE MODEL

Taketosi Kawabe, Tokyo, and Ken Ito, Yokohama, both of Japan, assignors to Nissan Motor Co., Ltd., Japan

Filed Jan. 28, 1986, Ser. No. 823,324
Claims priority, application Japan, Jan. 31, 1985, 60-15513; Jul. 12, 1985, 60-152564
Int. Cl.[4] B62D *5/06*
U.S. Cl. 180—142 20 Claims



1. A steering control system for a controlled vehicle, comprising:

means for sensing a steering wheel angle of said controlled vehicle,

means for sensing a vehicle speed of said controlled vehicle,

control means connected with said steering wheel angle sensing means and said vehicle speed sensing means for determining desired values of first and second vehicle motion variables corresponding to the sensed steering wheel angle and the sensed vehicle speed by solving at least one desired mathematical vehicle model representing a desired vehicle, determining first and second desired values of a steer angle, respectively, from said desired values of said first and second motion variables by solving an actual mathematical vehicle model representing said controlled vehicle, and determining a weighted average of said desired values of said steer angle, and

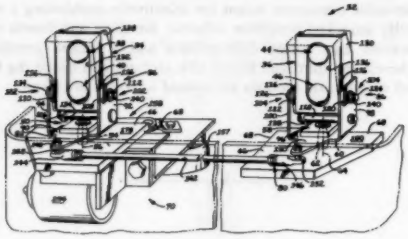
actuating means for steering at least one wheel of said controlled vehicle so that an actual steer angle of said wheel is maintained equal to said weighted average.

4,706,772

OSCILLATING SCANNER ARRANGEMENT

Ian J. Dawson, Mentor, and Robert L. McNutt, Painesville, both of Ohio, assignors to Caterpillar Industrial Inc., Mentor, Ohio

Filed Apr. 21, 1986, Ser. No. 853,829
Int. Cl.[4] B60T *7/16*
U.S. Cl. 180—167 **13 Claims**



1. A work vehicle, comprising:

a frame having an end portion, first and second spaced apart sides, each connected to said end portion, and a longitudinal vehicle axis;

first and second transceiver assemblies each having a transmitting portion and a receiving portion, said first transceiver assembly transmitting portion being adapted to deliver a first light signal having a central axis and said first transceiver assembly receiving portion being adapted to receive a reflection of said first light signal, and said second transceiver assembly transmitting portion being adapted to deliver a second light signal having a central axis and said second transceiver assembly receiving portion being adapted to receive a reflection of said second light signal;

first means for pivotally connecting the first transceiver assembly to the frame at a first location adjacent the frame end portion and frame first side, said first means defining a first axis about which said first transceiver assembly is pivotally movable;

second means for pivotally connecting the second transceiver assembly to the frame at a second location adjacent the frame end portion and frame second side, said second means defining a second axis about which said second transceiver assembly is pivotally movable;

power means for reciprocally moving said first transceiver assembly about said first axis between a first position at which said first light signal central axis extends outwardly from the frame end portion at a diverging angle "A" relative to a plane lying along and extending elevationally from the longitudinal vehicle axis, and a second position angularly spaced from said first position at which said first light signal central axis extends outwardly from the frame end portion at a converging angle "B" relative to said plane lying along and extending elevationally from the longitudinal vehicle axis; and

tie means for connecting said first transceiver assembly to said second transceiver assembly and reciprocally moving said second transceiver assembly about said second axis between a third position, at which the second light signal central axis extends in an outwardly direction from and relative to the frame end protion and at a converging angle "C" relative to said plane lying along and extending elevationally from the longitudinal vehicle axis, and a fourth position angularly spaced from said third position, at which said first light signal central axis extends in an outwardly direction from and relative to the frame end portion and at a diverging angle "D" relative to said plane lying along and extending elevationally from said longitudinal axis, said frame including:

a support member having a surface, said support member being connected to said frame and said support member surface being positioned normal to the elevationally oriented plane and parallel to the longitudinal frame axis, and including:

a first adjustment means for pivotally connecting said first transceiver assembly to said support member and maintaining said first transceiver assembly at a selected one of a plurality of angular locations relative to and spaced from the support member surface; and

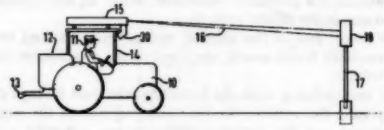
a second adjustment means for pivotally connecting said second transceiver assembly to said support member and maintaining said second transceiver assembly at a selected one of a plurality of angular locations relative to and spaced from the support member surface.

4,706,773

VEHICLE GUIDANCE SYSTEM PARTICULARLY FOR USE IN AGRICULTURE

Guy F. Reinaud, Dampierre en Yvelines, France, assignor to Imperial Chemical Industries plc, Welyn Garden City, England

Continuation of Ser. No. 381,871, May 25, 1982, abandoned. This application Jan. 30, 1986, Ser. No. 823,969
Claims priority, application United Kingdom, Jul. 1, 1981, 8120380
Int. Cl.[4] G06K *11/02;* **B62D** *1/28*
U.S. Cl. 180—169 **6 Claims**



1. A system for guiding a vehicle along a predetermined rectilinear path on a substantially horizontal plane, which system comprises a vehicle having a laser fixed thereon so as to direct a laser beam along the direction of motion of the vehicle towards a target, beam reversing means comprising an array of corner cubes carried by said target and positioned on the vehicle path so as to direct the beam back to the vehicle, and means for spreading the laser beam substantially solely transverse to said plane, said spreading means being coupled to said vehicle.

4,706,774

MOTORCYCLE REAR SUSPENSION SUBASSEMBLY

Masaharu Tsuboi, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 21, 1986, Ser. No. 865,537
Claims priority, application Japan, May 22, 1985, 60-109899
Int. Cl.[4] B62K *11/04, 25/04*
U.S. Cl. 180—227 **12 Claims**

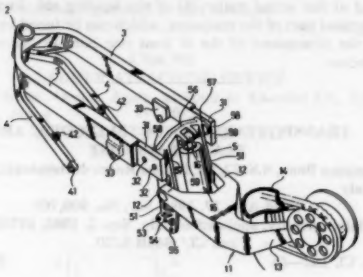
1. A motorcycle comprising:

a frame structure including a head pipe and a pair of main pipes extending from said head pipe,

said main pipes including oppositely spaced, generally parallel members having spaced terminal ends,

a rear suspension subassembly detachably connected to said frame structure, said subassembly including a rear suspension bracket containing at least one vertically elongated mounting portion and extending transversely between said main pipes with each lateral side thereof detachably connected to one of said main pipes adjacent the terminal end thereof,

a rear swing arm pivotally connected to said at least one mounting portion, and



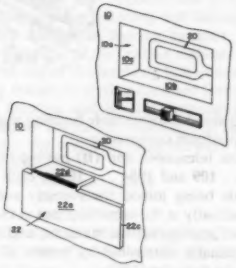
a cushion member mounted between said rear swing arm and said frame structure for cushioning the pivoting movement of said rear swing arm.

4,706,775

ANTI-THEFT COVER ASSEMBLY

Marlin C. Berg, 5851 Farmington Rd., West Bloomfield, Mich. 48033

Filed Oct. 15, 1986, Ser. No. 918,897
Int. Cl.[4] B60R *25/00*; B62H *5/00*
U.S. Cl. 180—289 **11 Claims**



1. An anti-theft cover assembly for use on the interior panel of an automobile door assembly of the type including a door locking mechanism actuable by an actuator member positioned in an opening in the interior door panel and movable by an operator positioned within the vehicle between locked and unlocked positions to respectively lock and unlock the door, said cover assembly comprising:

(A) a rigid cover plate member sized and configured to fit over and cover the actuator member and including a planar main body portion and a lip portion extending substantially totally around the periphery of said main body portion and extending inwardly from the inner face of said main body portion to define a recess;

(B) an attachment member;

(C) means for permanently securing said attachment member to said door panel adjacent the actuator member;

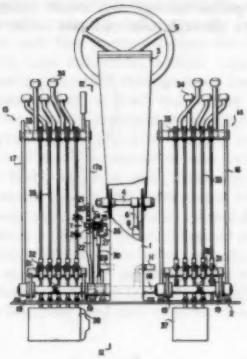
(D) securement means on said cover plate member operative in coaction with said attachment member to releasably secure said cover plate member to said attachment member and mount said cover plate member on the interior door panel in a position overlying the actuator member with the actuator member and said attachment member received within said recess of said cover plate member to cover said attachment member and preclude unauthorized access to the actuator member.

4,706,776

VEHICLE STEERING AND OPERATING APPARATUS

Takuzan Hyoki; Atsushi Uchida, and Yuichi Yamamoto, all of Kashiwazaki, Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho and Komatsu Zoki, Ltd., both of Tokyo, Japan

Filed Feb. 3, 1986, Ser. No. 825,286
Claims priority, application Japan, Feb. 6, 1985, 60-19840
Int. Cl.[4] B60K *26/00*; B62D *1/16*
U.S. Cl. 180—334 **4 Claims**



1. A vehicle steering and operating apparatus comprising:

(a) a steering wheel mounted box equipped with a steering wheel and instruments;

(b) support frames supporting operating levers groups on left and right sides of said steering wheel mounted box, said support frames being mounted on a floor plate so that they can be tilted freely and independently from the steering wheel mounted box in the longitudinal direction of the vehicle;

(c) a first engaging means mounted between said steering wheel mounted box and said floor plate to be engaged and disengaged by means of a first pedal for setting a plurality of attitudes of said steering wheel; and

(d) a second engaging means mounted between said support frames supporting said operating levers groups and said floor plate, said second engaging means to be engaged and disengaged by means of a second pedal for setting a pluraltiy of attitudes of said operating levers groups independently from said steering wheel.

4,706,777

STETHOSCOPE

Iosif Baumberg, 54 Bay 29 St., Brookyln, N.Y. 11510

Filed Feb. 25, 1986, Ser. No. 832,724
Int. Cl.[4] A61B *7/02*
U.S. Cl. 181—131 **6 Claims**

1. A stethoscope, comprising

two sound transmitting tubular elements each having two opposite ends formed so that one end of one sound transmitting tubular element is insertable into one ear of an examining person and one end of the other sound transmitting tubular element is insertable into the other ear of the examining person;

two sound receiving end pieces each applicable to the body of a person to be examined at a distance from one another and each connected with the other end of a respective one of said sound transmitting tubular elements so that one of said sound receiving end pieces is connected with one of said sound transmitting tubular elements but is not connected with the other of said sound transmitting tubular elements while the other of said sound receiving end pieces is connected with the other of said sound transmit-

ting tubular elements but is not connected with said one sound transmitting tubular element and therefore one sound channel is formed by said one sound receiving end piece and said one sound transmitting tubular element and another sound channel is formed by said other sound receiving piece and said other sound transmitting tubular element, and said channels do not communicate with one another so that when said sound receiving end pieces are applied to the body at a distance from one another, sound from the body are transmitted from said sound receiving end pieces through said sound transmitting tubular elements through said one and other noncommunicating

sound channels into the ear of the examining person and therefore the latter receives stereo sound information; and means for connecting said sound receiving end pieces with said sound transmitting tubular elements and including a valve member moveable between a stereo position in which each of said sound receiving end pieces is connected with a respective one of said sound transmitting tubular elements and the examining person receives the stereo sound information, and a mono position in which only one of said sound receiving end pieces is connected with both said sound transmitting tubular elements and therefore the examining person receives mono sound information.

4,706,778

IN-THE-EAR-CANAL HEARING AID

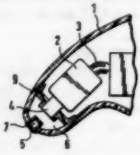
Jan Topholm, Værløse, Denmark, assignor to Topholm & Westermann ApS, Værløse, Denmark

Filed Oct. 20, 1986, Ser. No. 920,550

Claims priority, application Fed. Rep. of Germany, Nov. 15, 1985, 3540579

Int. Cl.[4] A61B *7/02*

U.S. Cl. 181—135 **5 Claims**



1. In-the-ear-canal hearing aid for people with impaired or defective hearing comprising: an ear-piece (**1**) containing a microphone, amplifier, telephone, battery compartment with battery, on/off switch and volume control and closed by a cover plate, the improvement wherein a hollow space (**6**) is formed at the inner end of the ear-piece between the sound outlet connector (**4**) of the telephone (**3**) and the sound outlet (**5**) of the hearing aid to the auricular canal, forming a resonator in conjunction with the sound outlet, and wherein a replaceable cerumen collector (**7**) with at least one bore (**8**) is fitted at the sound outlet (**5**) of the hearing aid, forming an integrated part of the resonator, which can be tuned by changing the dimensions of the at least one bore in the cerumen collector.

4,706,779

TRANSPORTABLE, TWIN TELESCOPIC ARM PLATFORM HOIST

Francesco Bono, S.S. 22, no. 16, San Rocco di Bernezzo (Cuneo), Italy

Filed Aug. 27, 1986, Ser. No. 900,706

Claims priority, application Italy, Sep. 2, 1985, 67746 A/85

Int. Cl.[4] B66B *9/20*

U.S. Cl. 182—63 **9 Claims**

1. An improved transportable hoisting machine mounted on a pivoting platform comprising:

a twin-arm telescopic unit (B) having two telescopic rails (**105** . . . **109** and **105***a* . . . **109***a*), each having telescopic elements being joined transversely and being extensible longitudinally at the same time and in the same measure by means of appropriate mechanisms, said twin arm (B) being longitudinally extensible by means of a first telescopic hydraulic cylinder (**104**);

a carriage (**120**) with a platform (**119**) being mounted on said twin arm telescopic unit and moved by means of steel ropes (**131**) connected to a first windlass (**121**), said carriage being equipped with four pairs of flanged, frustoconical rollers (**126–127** and **128–129**) on either side of said twin arm telescopic unit (B), said flages of said rollers being held against the sides of the telescopic twin arm unit by means of elastic devices (**130**), said rollers being supported by said carriage having a symmetrical, lateral carriage frame structure comprising a multiplicity of levers (**124,125**) being attached to said carriage, said levers having a pantographic type articulation, and having the purpose of maintaining the rollers against the side surfaces of said twin arm telescopic unit;

said machine also being equipped with a second windlass (**201**) provided with an incorporated brake having a steel rope having the purpose of locking twin arm (B) at any desired height, said first telescopic hydraulic cylinder (**104**) located on the pivoting platform (**111**) of said hoisting machine, stabilizes said twin arm telescopic unit when said carriage is loaded, said first telescopic hydraulic cylinder achieving stabilization of said twin arm telescopic unit by the pressurization of said first hydraulic cylinder after said twin arm telescopic unit has reached the desired height; and

said carriage also being equipped with an automatic emer-

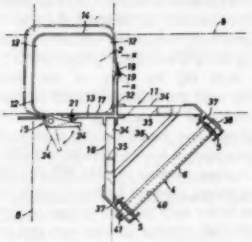
gency brake and a device (237,237*a*, 238, 239, 240) able to stop all hoisting machine operations if any slack is detected in steel ropes used in said machine.

4,706,780

LADDER ATTACHING DEVICE

Yoshio Ohashi, Osaka, Japan, assignor to Kansaka Co., Ltd., Osaka, Japan

Filed Jun. 4, 1987, Ser. No. 58,113
Int. Cl.[4] E06C *9/00*
U.S. Cl. 182—93 **6 Claims**



1. A device for attaching to a column a ladder comprising a pair of opposed side rails and a plurality of steps interconnecting the side rails and arranged at a predetermined spacing, the device comprising a bearing member fittable to a corner portion of the column in contact with opposite side surfaces of the portion, a column surrounding fastening belt having one end connected to one side end of the bearing member, a fastener attached to the other side end of the bearing member for releasably engaging the free end of the fastening belt to wind the belt thereon, and a fixing frame projecting outward from the outer side of the bearing member and having connecting portions connectable to the ladder for fixedly retaining the ladder in an upright position within the reentrant angle between the beams to be joined to the column.

4,706,781

FLUID-OPERATED CYLINDER WITH CUSHIONING FLOW RATE CONTROL VALVE MEANS

Yoshihiro Ikimi, and Osamu Tsukada, both of Kariya, Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Aichi, Japan

Filed Feb. 27, 1986, Ser. No. 833,952
Claims priority, application Japan, Feb. 28, 1985, 60-28790[U]; Feb. 28, 1985, 60-28791[U]
Int. Cl.[4] B66F *9/22*; F15B *15/22*
U.S. Cl. 187—9 E **9 Claims**

1. A fluid-operated cylinder adapted to be used as a load lifting cylinder, comprising:

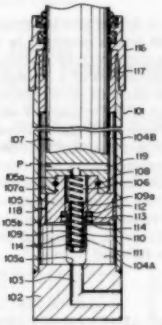
a cylinder casing having a cylindrical bore axially extended between first and second ends thereof, said first end having a fluid supply/discharge port formed at an inner end thereof and having a valve seat, and said second end having an open end through which a piston rod is axially movably received in said cylinder bore;

a piston element arranged at an inner end of said piston rod so as to be movable with said piston rod and having first and second pressure-receipt faces defining, in a cylindrical bore of said cylinder casing, a first cylinder chamber adjacent to said fluid supply/discharge port, and said second pressure-receipt face defining, in said cylindrical bore of said cylinder casing, a second cylinder chamber extending around said piston rod;

flow rate control valve means axially movably arranged in said piston element and cooperating with said valve seat for causing a gradual change in a flow rate of a working fluid flowing from said fluid supply/discharge port to said first cylinder chamber, and vice versa, through a predetermined amount of piston stroke when said piston element and said piston rod move away from and toward a bottom position adjacent to said fluid supply/discharge port, thereby cushioning shock generated in said fluid-operated cylinder at a time of starting or stopping movement of said piston element;

said flow rate control valve means including:

a cylindrical hollow valve body arranged in a cylindrical bore of said piston element so as to be axially movable between inwardly retracted and outwardly extended positions from said first pressure-receipt face of said piston element, said cylindrical hollow valve body having an axially extended through-bore forming a central fluid passageway, an inner end portion cooperating with a stop means arranged in said cylindrical bore of said piston element so as to permit a predetermined amount of axial movement of said cylindrical hollow valve body, an outer end portion capable of being tightly seated against said valve seat of said fluid supply/discharge port, and a plurality of radial orifice means arranged at a plurality of axially spaced positions of said cylindrical hollow valve body, respectively, for changing an extent of fluid communication between said axially extended through-bore of said cylindrical hollow valve body and said first cylinder chamber in



response to axial movement of said cylindrical hollow valve body, and;

spring means arranged in said cylindrical bore of said piston element and in said axially extended through-bore of said cylindrical hollow valve body for constantly urging said cylindrical hollow valve body from said inwardly retracted position toward said outwardly extended position; and

said piston rod is formed with fluid passageway means fluidly communicated with said cylindrical bore of said piston element and having at least one open end disposed in an outer circumference of said piston rod for communicating said cylindrical bore of said piston element as well as said axially extended bore of said cylindrical hollow valve body with said second cylinder chamber of said cylinder casing when said piston element is axially moved to said first end of said cylinder casing, a means is arranged adjacent to said second end of said cylinder casing for closing said open end of said fluid passageway means of said piston rod when said piston element is axially moved to a position adjacent to said second end of said cylinder casing, and said piston element is formed with one small through-hole piercing said first and second pressure-receipt faces for providing a constant fluid communication between said first and second cylinder chambers and for permitting fluid in the second chamber to slowly escape into the first chamber.

4,706,782

LIFTING AND LOWERING A RAIL SECTION

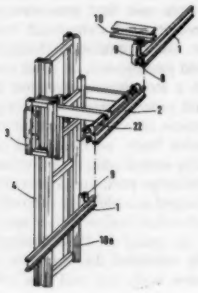
Johannes-Gerhard Spoeler, Borken, and Heinz-Uwe Janssen, Schwerte, both of Fed. Rep. of Germany, assignors to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany

Filed Apr. 11, 1986, Ser. No. 850,864

Claims priority, application Fed. Rep. of Germany, Apr. 16, 1985, 3513594; Feb. 21, 1986, 3606070

Int. Cl.[4] B66B *1/00, 5/16;* B61B *3/00*

U.S. Cl. 187—20 9 Claims



1. A device for lifting and lowering a rail track section in between two rail tracks mounted in different vertical levels and including an elevator type carriage carrying the rail track section; the improvement of a latching structure comprising:

rotatable latch elements with rounded ends and provided on said carriage in the vicinity of the rail section;

abutment and counter latch surfaces respectively at ends of said rail tracks and wherein at least an upper one of said tracks has passage ways and openings for said latch elements to pass through from below; and

means for turning the latch elements so that they will rest on the respective counter latch surfaces and thereby hold the rail track section in an aligned disposition for one or the other of the two rail trucks.

4,706,783

AUTOMATIC ADJUSTING DEVICE FOR A BRAKE

Heinrich-Bernhard Rath, Vallendar, and Dietrich Holz, Niederbachheim, both of Fed. Rep. of Germany, assignors to Lucas Industries public limited company, Birmingham, England

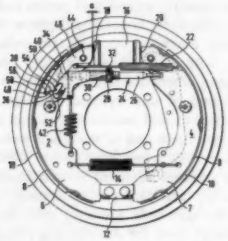
PCT No. PCT/EP85/00459, § 371 Date May 13, 1986, § 102(e) Date May 13, 1986, PCT Pub. No. WO86/01866, PCT Pub. Date Mar. 27, 1986

PCT Filed Sep. 12, 1985, Ser. No. 874,174

Claims priority, application Fed. Rep. of Germany, Sep. 14, 1984, 8427187

Int. Cl.[4] F16D *51/52*

U.S. Cl. 188—79.5 B 12 Claims



1. In an automatic adjusting device for a brake, especially a motor vehicle brake with which a strut (**24**) is connected functionally in parallel with a brake actuator (**16**) and has an effective length which depends on the relative positions of two strut members (**26,30**) adjustable with respect to each other and one (**26**) of them having an adjustable portion connectable with an adjusting member by which the strut (**24**) is extendable upon actuation of the brake and which cooperates with at least one intermediate member (**46**) normally disposed between a brake shoe web (**6**) and a piston (**18**) for transmitting the brake actuating force to the web independently of the strut (**24**), as long as the brake actuating force does not exceed a predetermined amount, wherein said intermediate member comprises a locking member (**46;246;350,360;446**) having a side facing the piston (**18**) of the hydraulic actuator (**16**) and protrudes a predetermined salient distance (a) beyond the end of the web (**6**) facing the piston (**18**), when the brake is at rest, so that the brake actuating force is normally transmissible from the piston (**18**) to the web (**6**) by way of the locking member (**46;246;350,446**) until the salient distance (a) has been reduced by the movement of the locking member (**46;246;350,446**) relative to said web and the piston (**18**) abuts against the side of the web, a heat sensitive spring element (**50;250;350**) cooperating with the locking member (**46;246;350,360,446**), the characteristics of the spring element being variable with rising temperature of the brake such that movement of the locking member (**46;246;350,446**) relative to the web results whereby the salient distance (a) is reduced, and means for connecting said locking member (**46;246;360,446**) with said adjusting member (**34,234,334,434**) to prevent movement thereof and thus adjustment of said strut upon a predetermined reduction of said salient distance in response to a predetermined amount of at least one of the brake actuating force and a predetermined value of the temperature.

4,706,784

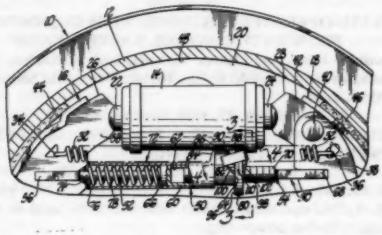
DRUM BRAKE ADJUSTERS

Ronald L. Shellhause, Vandalia, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Sep. 3, 1985, Ser. No. 771,770

Int. Cl.[4] F16D *65/40*

U.S. Cl. 188—79.5 B 11 Claims



1. A drum brake adjuster comprising an expandable strut adapted to extend between first and second brake shoes of a drum brake to be actuated and released and adjusted, said expandable strut having:

a first member, a second member telescopically received in said first member, and a third member telescopically receiving said first member and a portion of said second member, all in coaxial relation, said first and third members being adapted to operatively engage the first brake shoe in force-transmitting relation and said second member being adapted to operatively engage the second brake shoe in force-transmitting relation, and spring means acting on said first and third members continually urging said first member toward said second member and said third member away from said second member;

an adjusting element on said second member normally en-

gaging said first member in abutting relation to limit the minimum length of said strut and movable on said second member toward said first member to increase the effective minimum length of said strut when sufficient brake shoe wear and actuation requires brake adjustment, said adjusting element including a driven escapement means incrementally actuatable to provide such adjustment;

and escapement drive means on said third member engageable, in a brake actuation and release cycle in which brake adjustment is required, with said driven escapement means in driving relation at least once during such a brake actuation and release cycle, said escapement drive means when so engaging said driven escapement means driving said adjusting element to move same on said second member axially toward said first member so that when the brake is fully released said first member abuttingly engages said adjusting element at an increased strut minimum length position to establish an adjusted position of the brake shoes.

4,706,785

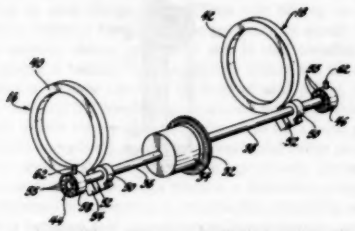
SINGLE POINT ACTUATED SELF-ADJUSTING BRAKE MECHANISM IN A VEHICLE DRIVEN BY A CROSS-DRIVE TRANSMISSION

James F. Hartz, Indianapolis, Ind., assignor to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 889,271, Jul. 25, 1986, abandoned. This application Nov. 10, 1986, Ser. No. 928,861

Int. Cl.[4] F16D *65/14*

U.S. Cl. 188—106 F **3 Claims**



1. In a mechanism having first and second members to be braked and first and second brakes respectively acting on said first and second members to be braked when actuated to brake the same, hydraulic brake actuation means and mechanical brake actuation means for actuation of said first and second brakes, each of said brakes being subject to wear and each of said brakes having adjusting means therein active upon brake release after a mechanical brake apply to adjust the brake associated therewith for such wear, the improvement comprising:

a rotatable brake actuation input shaft having cam means rotatably driven by said input shaft through an arc of rotation in accordance with brake force demand, said cam means having first and second consecutive predetermined ranges of cam means arcuate movement;

mechanical drive means operatively driven by rotational movement of said input shaft throughout a driven range sufficient to actuate said brakes through said mechanical brake actuation means from brake release to a maximum mechanically applied brake apply condition, said mechanical drive means including a differential gear assembly having an input member operatively driven by said input shaft and first and second output members operatively differentially driving said mechanical brake actuation means respectively for said first and second brakes;

hydraulic brake actuation pressure control means responsive to said first predetermined range of cam means arcuate movement to permit the delivery of hydraulic brake actuating pressure to said hydraulic brake actuation means through a predetermined brake actuating pressure range which will actuate said brakes from release to a maximum hydraulic brake actuating pressure brake applied condition, said second predetermined range of cam means arcuate movement being a dwell range permitting additional stroke of said mechanical drive means as required to cause said mechanical brake actuation means to take up any unadjusted brake wear in said brakes and obtain the maximum mechanically applied brake apply condition without affecting said hydraulic brake actuation pressure control means;

said brake adjusting means comprising brake return-limiting one-way clutch means in each of said first and second brakes, said clutch means respectively allowing brake applying movement of one of said differential gear assembly output members relative to brake applying movement of the other of said differential gear assembly output members and permitting different brake actuating movements of said output members to take up different amounts of brake wear that may exist in each of said first and second brakes to then achieve equal braking forces generated in said first and second brakes and exerted on said first and second members to be braked, said clutch means each limiting the return stroke of said brake associated therewith when said associated brake returns to the full release condition to establish an adjusted brake position adjusted for the amount of brake wear of said associated brake since the last adjustment thereof.

4,706,786

BRAKE LINKAGE FOR VEHICLE BRAKES

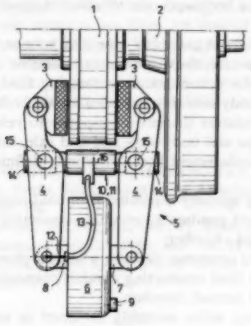
Julius Nadas, Eching, Fed. Rep. of Germany, assignor to Knorr-Bremse AG, Munich, Fed. Rep. of Germany

Filed Jan. 27, 1986, Ser. No. 822,566

Claims priority, application Fed. Rep. of Germany, Jan. 25, 1985, 3502560

Int. Cl.[4] F16D *55/02, 65/38, 65/52*

U.S. Cl. 188—196 BA **5 Claims**



1. Brake clamp for a vehicle disc brake with a play adjustment device including a pull rod **(11)** of adjustable length located between two brake clamp levers **(4)** and loaded by a brake application force exerted by a brake force motor **(6)**, said play adjustment device **(10)** comprising a threaded spindle drive having a rotatable double spindle **(21)** with reversely self-locking threaded end portions **(20)** and two non-rotatable nuts **(14)** held by said brake clamp levers **(4)**, said end portions **(20)** being screwed into said nuts **(14)**, wherein said double spindle **(21)** is continuously loaded by a pre-stressed spiral spring **(23)** in a direction of rotation to approach said nuts **(14)**, wherein said nuts **(14)** have mutually-facing cylindrical necks **(17)**, a casing **(18)** being connected to one of said necks and extending to the other of said necks, an outer end of said spiral

spring (23) being attached to said casing (18) and an inner end of said spiral spring (23) being attached to said double spindle (21), and wherein a rotary lock (22, 26) controlled by a movable part (8) of said brake force motor (6) and opening upon movement of said movable part (8) for an application stroke of a brake clamp, is provided for said double spindle (21).

4,706,787

VIBRATION DAMPER WITH VARIABLE DAMPING FORCE

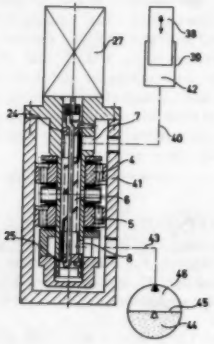
Felix Wössner, Schweinfurt, Fed. Rep. of Germany, assignor to Fichtel & Sachs AG, Schweinfurt, Fed. Rep. of Germany

Division of Ser. No. 808,292, Dec. 12, 1985, Pat. No. 4,671,392. This application Jan. 27, 1987, Ser. No. 6,964

Claims priority, application Fed. Rep. of Germany, Dec. 18, 1984, 3446133

Int. Cl.[4] **F16F** *9/46, 9/14;* **B60G** *11/26*

U.S. Cl. 188—299 **1 Claim**



1. A vibration damper apparatus for a motor vehicle having an axle and a bodywork, the vibration damper apparatus comprising:

a displacement assembly mounted between the bodywork and the axle, the displacement assembly including a container for accommodating damping fluid and a displacement body movably mounted in said container for movement relative thereto in response to relative movement between said bodywork and said axle, said container and said displacement body conjointly defining a first chamber;

a housing spatially separated from said container;

a first fluid conducting conduit connecting said housing to said first chamber;

a pressure container defining a second chamber;

a second fluid conducting conduit connecting said housing to said second chamber;

a damping valve assembly mounted in said housing and including:

two damping valve systems connected in series between said chambers;

a bypass channel bypassing said damping valve systems and communicating with said chambers via said connecting conduits, respectively;

first outer passage means interposed between said first conduit and said bypass channel;

second outer passage means interposed between said second conduit and said bypass channel;

said two valve systems conjointly defining a space therebetween;

intermediate passage means connecting said space to said bypass channel; and,

a passage closure arrangement mounted in said housing for changing the damping forces developed by said vibration damper apparatus, the arrangement including:

first closure means corresponding to one of said passage means for closing and opening the same;

second closure means corresponding to one other one of said passage means for closing and opening the same; and,

actuation means for actuating at least one of said closure means to close off the passage means corresponding thereto thereby changing the damping of the damping fluid as it is displaced between said chambers.

4,706,788

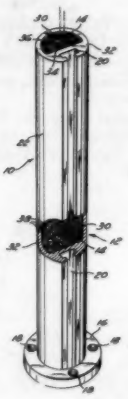
VIBRATION DAMPED APPARATUS

Scott Inman, and Mitchell K. Enright, both of Santa Ana, Calif., assignors to Melles Griot, Irvine Company, Irvine, Calif.

Filed Apr. 15, 1985, Ser. No. 723,546

Int. Cl.[4] **F16F** *7/10, 1/14, 9/30;* **F16M** *13/00*

U.S. Cl. 188—378 **34 Claims**



1. A mechanically damped apparatus, comprising

a member; and

a damping mass, mechanically coupled to said member for damping oscillation of said member, said damping mass comprising:

a volume of elastic material; and

a plurality of submasses, distributed in said volume of elastic material such that (i) said damping mass exhibits plural submasses in each of three mutually orthogonal intersecting planes and (ii) plural ones of said submasses are in close proximity to other submasses so as to interfere with each other upon compression of said damping mass, the volume of the interfering submasses greater than the volume of elastic material filling intersticies between the interfering submasses, said elastic material being comprised of a material which is more easily deformed than said submasses by said oscillations.

23. A method of manufacturing a damping mass for a member which exhibits oscillations at a natural resonant frequency upon exposure to an excitation force, said method comprising:

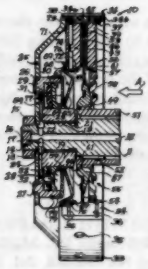
homogeneously distributing plural submasses throughout at least a portion of the volume of an elastic material comprised of a material which is more easily deformable than the submasses to form an agglomeration such that said submasses in said portion of said volume (i) are in close proximity with said elastic material filling intersticies between said submasses, and (ii) have a combined volume which is greater than the volume of elastic material filling the intersticies.

4,706,789

STARTING CLUTCH ASSEMBLY FOR A CONTINUOUSLY VARIABLE TRANSMISSION

John W. McColl, Broadview; Philip J. Mott, Des Plaines, and Ralph D. Salle, Lake Zurich, all of Ill., assignors to Borg-Warner Automotive, Inc., Troy, Mich.

Filed Jul. 1, 1985, Ser. No. 750,206
Int. Cl.[4] F16D *25/04, 25/063, 13/74*
U.S. Cl. 192—0.075 **11 Claims**



1. A starting clutch adapted to engage upon a signal from a throttle induced system oil pressure to couple a constantly rotating driving shaft with a driven concentric sleeve shaft, comprising a first hub operatively connected to rotate with said driving shaft, a clutch cover secured to said hub and having an axial flange portion, said hub having an annular pressure chamber formed therein receiving an axially reciprocable annular piston, an annular seal in said chamber behind said piston, a balance cap operatively connected on said hub forming a balance chamber in front of said piston, a clutch plate carrying friction facings, a second hub operatively connected to said sleeve shaft and secured to the clutch plate, an end plate operatively connected to said axial flange portion, an axially reciprocable pressure plate operatively connected to rotate with said axial flange portion, a Belleville spring pivotally mounted in said cover, a pressure disc extending generally radially between said piston and Belleville spring, said Belleville spring being actuated by said piston and pressure disc to engage said pressure plate and urge it against the clutch plate located between the pressure plate and end plate, a plurality of retractor spring fingers formed as one piece with said pressure disc engaging said pressure plate at its inner periphery to retract said pressure plate, and a source of hydraulic pressure communicating with said pressure chamber.

4,706,790

GAIN SCHEDULING TECHNIQUE FOR A CLOSED LOOP SLIP CONTROL SYSTEM

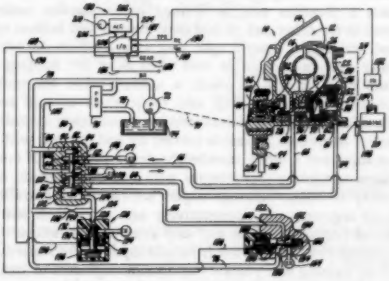
Bruce D. Lockhart, Rochester; Dean E. McCulloch; Gordon L. Tierney, both of Washington, and Cyrus A. Wehner, Warren, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jul. 17, 1986, Ser. No. 886,421
Int. Cl.[4] F16D *43/284, 47/02;* **B60K** *41/02*
U.S. Cl. 192—3.3 **4 Claims**

1. In a motor vehicle including a clutch mechanism connected between input and output members of a fluid torque converter and adapted to transmit engine output torque, the clutching mechanism being characterized in that its torque capacity is inversely proportional to the slip speed between its input and output members over at least a portion of the range of such slip speed, and a clutch actuating mechanism adapted to be supplied with fluid pressure for controlling the torque capacity of said clutch mechanism, a method of operation for controlling the slip speed of the clutch mechanism so as to avoid the transmission of transient engine output torque excursions therethrough, the method comprising the steps of:

defining a desired slip signal corresponding to a desired level of clutch slippage for avoiding the transmission of said transient engine output torque excursions through the clutch mechanism, an actual slip signal corresponding to the actual slip speed of the clutch mechanism, and a slip error signal E_s in accordance with the difference between the actual and desired slip signals;

supplying fluid pressure to the clutch actuating mechanism in relation to the sum of a first relatively small magnitude clutch pressure command, and a second relatively large magnitude clutch pressure command;



generating said first relatively small magnitude clutch pressure command as a proportional function of the slip error signal for any given value of desired slip, thereby to generate relatively small magnitude but substantially immediate changes in the pressure supplied to the clutch actuating mechanism when said transient engine output torque excursions produce changes in the actual slip; and

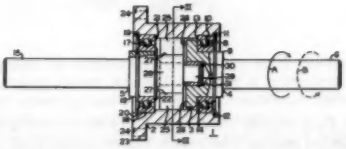
generating said second relatively large magnitude clutch pressure command as an integral function of the ratio of the slip error signal to the desired slip signal, at least when the actual slip signal is less than the desired slip signal, thereby to generate relatively large magnitude but integral changes in the pressure supplied to the clutch actuating mechanism when changes in a steady state engine output torque produce changes in the acutal slip.

4,706,791

IRREVERSIBLE FREE WHEELING CLUTCH

Silvio Magliano, Turin, Italy, assignor to American Standard Inc., Pittsburgh, Pa.

Continuation of Ser. No. 682,201, Dec. 17, 1984, abandoned. This application Oct. 16, 1986, Ser. No. 919,414
Int. Cl.[4] F16D *15/00, 59/00, 67/00*
U.S. Cl. 192—8 R **6 Claims**



1. An irreversible clutch comprising, a hollow cylindrical housing having an axial bore for receiving a rotatable input shaft rotatably supported in said hollow cylindrical housing by a first ball bearing, said first ball bearing includes an inner race which is carried by an intermediate enlarged portion of said input shaft and which is seated against a shoulder portion

formed on said intermediate enlarged portion of said input shaft, said first ball bearing includes an outer race which is seated against a shoulder portion in an annular undercut located in one end of said axial bore of said hollow cylindrical housing, a first split ring inserted into an internal annular groove formed in said axial bore for holding said first ball bearing in place, a rotatable output shaft including a stem portion which is journaled in a journal bearing which is located in said input shaft, said output shaft is rotatably supported in said hollow cylindrical housing by a second ball bearing, said second ball bearing includes an inner race which is carried by an intermediate enlarged portion of said output shaft and which is seated against a collar portion formed on said intermediate enlarged portion of said output shaft, said second ball bearing includes an outer race which is seated against a shoulder portion formed in an annular undercut located in the other end of said axial bore of said hollow cylindrical housing, a second split ring inserted into an internal annular groove formed in said axial bore for holding said second ball bearing in place, a nonreversible transmission mechanism interconnecting said input shaft to said output shaft, said nonreversible transmission mechanism including a plurality of arcuate segments carried by and integral with said input shaft and a block member having a plurality of contact surfaces carried by and integral with said output shaft, and a plurality of roller bearings caged between said plurality of arcuate segments and cooperatively associated with said plurality of contact surfaces and said axial bore to allow rotary movement to be transferred from said input shaft to said output shaft by causing said plurality of arcuate segments to spin said plurality of roller bearings to work on said plurality of contact surfaces and to prevent rotary movement from being transferred from said output shaft to said input shaft by causing said plurality of contact surfaces to lock said plurality of roller bearings against said axial bore.

4,706,792

FLUID FRICTION CLUTCH

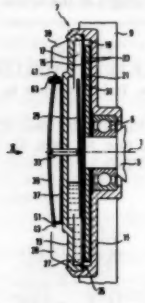
Werner Göb, Kürnach, Fed. Rep. of Germany, assignor to Fichtel & Sachs AG

Filed Oct. 21, 1985, Ser. No. 789,622

Claims priority, application Fed. Rep. of Germany, Oct. 20, 1984, 3438533; Nov. 17, 1984, 3442103

Int. Cl.⁴ F16D *31/00*

U.S. Cl. 192—58 B **12 Claims**



1. A fluid friction clutch, especially for a cooling fan of a fluid-cooled internal combustion engine, comprising:

(a) a rotor drivable in rotation about a rotation axis,

(b) a housing rotatable in relation to the rotor and enclosing a reservoir and a working chamber, said rotor being arranged in the working chamber and defining at least one shear gap with the working chamber,

(c) a valve device for the control of a flow cycle of shear fluid between the reservoir and the working chamber,

(d) a substantially elongated rectilinearly extending bimetallic element secured on an axial end face of the housing in a retaining fitting for the temperature-dependent control of the valve device, said retaining fitting having, in the region of the ends of the bimetallic element opposite to one another in the elongated direction of said bimetallic element, stop faces which fix said ends both in the circumferential direction of the housing and axially and radially of the rotation axis, said retaining fitting having an insertion opening therein through which said bimetallic element is displaceable in the elongated direction thereof, and

(e) at least one clip separate from the retaining fitting and slidably fitted on to the retaining fitting in the region of the opening in the retaining fitting and positioned between an end surface of the bimetallic element and a stop shoulder on said retaining element facing the bimetallic element, for the limitation of the movement play of the bimetallic element in the elongated direction of the bimetallic element through the opening in the retaining fitting.

4,706,793

CONVEYOR SYSTEM WITH ROLLERS AND PLUNGERS

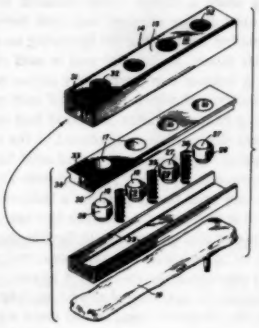
Camillo Masciarelli, 415 Berlin Rd., Marlboro, Mass. 01752

Continuation of Ser. No. 755,065, Jul. 15, 1985, Pat. No. 4,627,526. This application Sep. 19, 1986, Ser. No. 909,501

The portion of the term of this patent subsequent to Dec. 9, 2003, has been disclaimed.

Int. Cl.⁴ B65G *13/075, 13/10*

U.S. Cl. 193—35 A **1 Claim**



1. Conveyor system, comprising:

(a) a frame on which is mounted a series of rollers for supporting and driving an article along the frame, the rollers being arranged in spaced, parallel relationship with a space between each adjacent pair of rollers,

(b) a conveyor element located in one of the said spaces, the element consisting of a main body having an upper surface located below the level of the tops of the rollers, the main body having a series of bores in which plungers are slidable carried, the plungers being provided with ball-type anti-friction members, and

(c) a pneumatic bladder located in the main body to move the plungers from a first position below the said level of the rollers to a second position above the said level, wherein several conveyor elements are provided in a closely-related group to form a table,

wherein the main body includes a tube with a rectangular cross-section and with a flat upper wall having the said upper surface and formed with circular apertures defining part of the said bores, and wherein the main body includes guide means located with the tube and formed with the remainder of the said bores, wherein a pressure plate lies between the bladder and the guide means, and wherein coil springs are located between the pressure plate and the

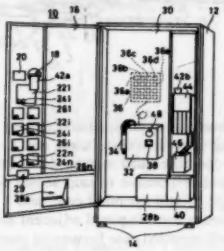
guide means to continuously press the pressure plate toward the bladdeer during both inflated and the non-inflated conditions of the bladder.

4,706,794

VENDING MACHINE WITH A COMMON DISPLAY

Misao Awane; Seiji Hara, and Satoshi Kobayashi, all of Saitama, Japan, assignors to Sanyo Electric Co., Ltd., Japan

Filed Sep. 20, 1984, Ser. No. 652,804
Int. Cl.[4] G07F 9/08
U.S. Cl. 194—217 **11 Claims**



1. A vending machine comprising:
- a plurality of selection switches corresponding to a plurality of sales items,
- a valuable media insertion part accepting insertion of valuable media,
- value calculating means for calculating the value of said valuable media inserted through said valuable media insertion part,
- memory means having a plurality of price memory parts corresponding to said plurality of sales items,
- addressing means for addressing a corresponding one of said price memory parts of said memory means in response to operation of any one of said selection switches,
- price data reading means for reading price data from the corresponding one of said price memory parts addressed by said addressing means,
- determining means for determining whether or not an item corresponding to a selection switch operated is able to be sold based on a value calculated by said value calculating means and a price data read by said price data reading means,
- a numeric value display for normally displaying said value calculated by said value calculating means, and
- changing means for changing a content of said numeric value display so as to display said price data read by said price data reading means when said determining means determines that the item selected is not to be sold.

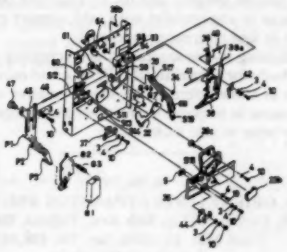
4,706,795

COIN DISCRIMINATOR

Mitsugu Mikami, Kawagoe; Kougi Yukimoto, Sakado, and Jun Ishii, Kawagoe, all of Japan, assignors to Kabushiki Kaisha Nipponcoinco, Tokyo, Japan

Filed Dec. 16, 1985, Ser. No. 809,491
Claims priority, application Japan, Dec. 18, 1984, 59-265199
Int. Cl.[4] G07D 5/02, 5/08
U.S. Cl. 194—317 **6 Claims**

1. A coin discriminator for discriminating good coins from bad coins among a plurality of different types of coins and sorting the coins by denomination, comprising:
- a transfer lever for guiding the different types of coins from a front coin passage of a main plate to a rear coin passage thereof;
- a rear gate mounted in said rear coin passage and pivotal about a pivot pin mounted on said main plate;
- a rear gate stop pivotal about said pivot pin;
- a spring fittedly mounted on said pivot pin for biasing said rear gate stop axially of said pivot pin and for biasing said rear gate and said rear gate stop in opposite directions from each other circumferentially of said pivot pin, said rear gate stop being engaged with a hole formed in said main plate, when said rear gate stop is moved against the axial biasing force of said spring;



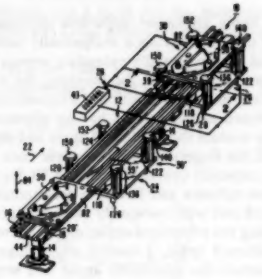
- a cradle for selecting the coins in accordance with diameters of the coins; and
- a swing lever swingable towards a space between two ends of said cradle, said swing lever adapted to be urged so that a small coin having a diamete smaller than a distance between said two ends of said cradle to pass between said two ends, and adapted to be pushed away by a large coin to allow said large coin to be removed from said cradle.

4,706,796

SYSTEM FOR TRANSFERRING AND LOCATING A BODY RELATIVE TO A SUPPORT

Robert W. Chambers, Willingboro, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Aug. 5, 1985, Ser. No. 762,634
Int. Cl.[4] B65G 47/00
U.S. Cl. 198—345 **8 Claims**



1. A system for transferring a body to a work station, said body including means adapted to carry a workpiece, said system for orienting and clamping the transferred body to a support at the work station, said system comprising:
- a support having a plurality of stationary spaced reference surface defining a reference plane at said work station;
- transfer means movably coupled to the support for displacement into the work station in a coarse alignment with said surfaces at the work station;
- said transfer means including a body movably secured thereto, said body having a plurality of spaced reference surfaces, each corresponding to a different one of said support reference surfaces;

said body and transfer means including alignment and securing means for movably securing said body to said transfer means in a given alignment therewith so that the body can displace a limited distance relative to the transfer means while remaining secured to the transfer means;

actuating means secured to the support at the work station including means responsive to said coarse alignment of said transfer means with said support reference surfaces for displacing said body from said transfer means within said limited distance and for locking said body reference surfaces in engagement with said support reference surfaces at said reference plane; and

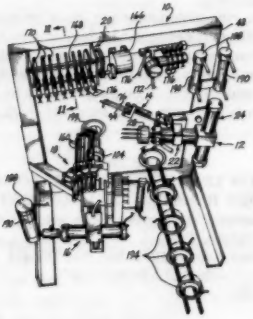
body aligning means secured to said actuating means and to said body for automatically aligning said movably secured body in a fine reference alignment relative to said coarse alignment in response to and during said displacing of said body prior to said locking.

4,706,797

APPLE ORIENTATION APPARATUS AND METHOD

Richard L. Carlson, 801 S. 30th Ave., Yakima, Wash. 98902

Filed Mar. 11, 1986, Ser. No. 838,542
Int. Cl.[4] B65G 47/24
U.S. Cl. 198—394 **26 Claims**



1. An apple alignment apparatus comprising: a pivotally mounted cylinder having a reciprocally movable head with clutch and with outwardly extending prongs for piercing and holding an apple, means for pivoting the cylinder between apple pickup and apple positioned location, means for rotating the positioned apple, a probe having aligned multi fingers to resiliently contact the positioned apple and stop apple rotation by one of the fingers entering an apple core indent, a second pivotally mounted cylinder located at 90 degrees with respect to the first cylinder and having a reciprocally mounted head with clutch and with outwardly extending prongs for piercing and holding the positioned apple, means for rotating the newly held positioned apple, a second single finger probe to resiliently contact the positioned apple and stop apple rotation when it enters the apple core indent to align the core of the apple, and means for placing the aligned apple onto a holder for further processing.

4,706,798

OVERHEAD CASE POSITIONER

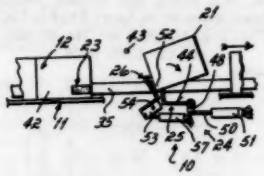
Joseph L. Hollmann, 1617 W. Belmar Pl., Cincinnati, Ohio 45224

Filed Nov. 3, 1986, Ser. No. 926,208
Int. Cl.[4] B65G 47/24
U.S. Cl. 198—399 **9 Claims**

1. A case positioner for sensing the presence of and inerting only an upended case moving in a series of cases including inverting and upended cases along a conveyor behind a preceding case and ahead of a succeeding case, said positioner comprising:

a detector including a sensor for sensing the presence of an upended case;

first stop means responsive to the actuation of said sensor for stopping said upended case;



second stop means spaced upstream of said first stop means for stopping said succeeding case; and

a selectively operable third stop spaced downstream of said first stop and responsive to said sensor for engaging the leading edge of said upended case; and

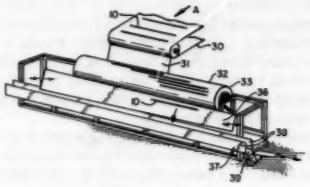
an inverter mechanism disposed adjacent said third stop for pivoting said upended case forwardly over said third stop.

4,706,799

ORIENTED STRAND LAY-UP

Mark T. Churchland, Vancouver, and Walter W. Schilling, Delta, both of Canada, assignors to MacMillan Bloedel Limited, British Columbia, Canada

Division of Ser. No. 547,578, Nov. 1, 1983, Pat. No. 4,563,237. This application May 28, 1985, Ser. No. 738,542
Int. Cl.[4] B65G 47/26
U.S. Cl. 198—457 **7 Claims**



1. An apparatus for forming an oriented, compressed and bonded composite product having elongated resin coated members at least about one foot long which are deposited into a lay-up mat with each member oriented substantially in the longitudinal direction of said mat comprising:

a first conveyor means for conveying said elongated members;

a second conveyor means positioned to collect said elongated members individually from said first conveyor means, said second conveyor means being movable in a longitudinal direction substantially in line with the length of said members while conveying said elongated members in a direction substantially normal to the length of said members; and

a third conveyor means positioned in a lay-up trough for holding and conveying said mat, said third conveyor having a length sufficient to accept the conveyed elongated members from the longitudinally movable second conveyor means, said third conveyor and said lay-up trough adapted to accept said conveyed elongated members to be laid in the lay-up mat, wherein the second conveyor means deposits the elongated members over a length of the third conveyor means that is at least as long as the greater of (i) 1.5 times the length of the elongated

members, and (ii) 30 times the final thickness of the composite product.

4,706,800

DEVICE FOR CONVEYOR TRACKS

Mats I. Davidson, Djupadal, 502 78 Gånghester, Sweden

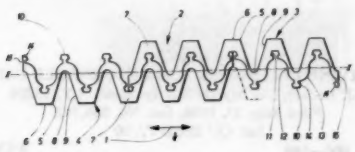
PCT No. PCT/SE81/00268, § 371 Date May 7, 1982, § 102(e) Date May 7, 1982, PCT Pub. No. WO82/00990, PCT Pub. Date Apr. 1, 1982

Continuation of Ser. No. 705,857, Feb. 27, 1985, abandoned, which is a continuation of Ser. No. 380,725, May 7, 1982, abandoned. This PCT application Sep. 17, 1981, Ser. No. 883,868

Claims priority, application Sweden, Sep. 17, 1980, 8006508

Int. Cl.⁴ B65G *17/32*

U.S. Cl. 198—685 **6 Claims**



1. An elongated driving element for a heavy-duty, material-carrying conveyor, said driving element being made of yielding material and being movable by driving means on a track having guiding means for the driving element, said driving element being a band having a center axis, a first side on one side of said center axis, and a second side on the other side of said center axis, and longitudinally extending third and fourth sides perpendicular to said first and second sides, V-shaped grooves in said driving element, each V-shaped groove extending continuously across the entire width of said driving element between said third and fourth sides and having a base on one of said first and second sides and a body portion extending inwardly beyond said center axis toward the other of said first and second sides to have the apex of each groove located closely adjacent to said center axis and positioned so said center axis is located between said base and said apex, said first, second, third and fourth sides forming flat surfaces of substantial size for contact with the guiding means of the track, said V-shaped grooves being located in said first and second sides of said driving element and alternating along said center axis to define a zig-zag configuration with said center axis interrupted by said body portions of said grooves, whereby said driving element is bendable along said center axis in several planes and twistable about said center axis, said grooves in said driving element forming engagement means for supporting material-carrier elements movable along the track.

4,706,801

CONVEYOR ROLLER WITH TORQUE OVERLOAD RELEASE MEANS

John R. Vessey, Linden, Mich., assignor to Excel Corporation, Fenton, Mich.

Filed Oct. 31, 1985, Ser. No. 793,700

Int. Cl.⁴ B65G *13/06*

U.S. Cl. 198—781 **7 Claims**

1. A conveyor roller assembly for use with a conveyor having a frame comprising

a shaft,

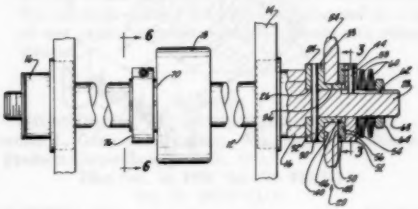
means for rotatably mounting said shaft to the frame,

a drive member having two axial ends and rotatably mounted to one end of said shaft,

a first friction pad comprising a first disk and a tubular flange extending axially from an inner end of said first disk, said tubular flange having an outer durable surface upon which said drive member is rotatably mounted, and said first friction pad having a central axial throughbore receiving said shaft,

means extending radially through said axial throughbore for securing said first friction pad to said shaft against axial and rotational movement with respect to said shaft, said first friction pad having an axial end adapted to flatly abut against a substantial portion of one axial end of said drive member,

a second friction pad comprising a second disk having a circular axial throughbore dimensioned to fit over said tubular flange, so that a free end of said tubular flange is positioned within the throughbore of said second friction pad, and said second disk having a flat surface adapted to flatly abut against the other axial end of said drive member, said second disk being both rotatable and axially slidable with respect to said shaft,



a spacer axially slidably mounted to said shaft, means for securing said spacer against rotation with respect to said shaft, so that one axial end of said spacer abuts against the other flat surface of said second friction pad, wherein said drive member is sandwiched between said first and second friction pads and is rotatably supported by said tubular flange,

wherein said free end of said tubular flange terminates short of said spacer, and

means for adjustably and resiliently urging said spacer towards said drive member.

4,706,802

DEVICE FOR CONDITIONING FABRICS IN THE TUMBLE-DRYER

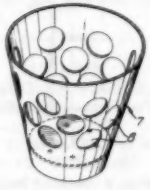
Arthur G. Leigh, Wirral, and John R. Martin, Birkenhead, both of England, assignors to Lever Brothers Company, New York, N.Y.

Filed May 20, 1986, Ser. No. 865,219

Claims priority, application United Kingdom, May 29, 1985, 8513480

Int. Cl.⁴ F26B *7/00*

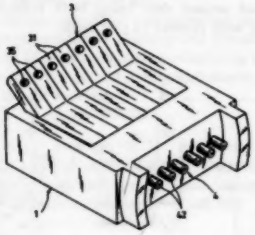
U.S. Cl. 206—0.5 **5 Claims**



1. A device for conditioning fabrics in a laundry dryer, which device comprises a fabric conditioning agent in freely flowing powder form in a container having a plurality of apertures through which the powdered fabric conditioning agent can pass under laundry dryer operating conditions, the container being provided with at least one outwardly projecting region which is effective to prevent or reduce direct contact between the said apertures and the fabrics, the projecting region including means to permit nesting with a second identi-

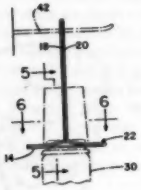
cal device in such a manner that the second device will close the said apertures.

4,706,803
KEY SELECTOR DEVICE
Shih-Fu Wang, No. 131, Sec. 2, Kan-Yuan Street, Shu-Lin Town, Taipei County, Taiwan
Filed Jul. 23, 1986, Ser. No. 888,260
Int. Cl.[4] A45C *11/00*
U.S. Cl. 206—37.1 **3 Claims**



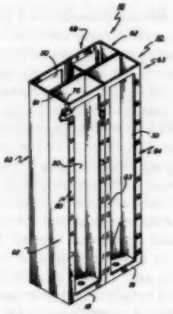
1. A key selector device, which comprises a substantially rectangular box having a rear wall, upper wall, and sidewalls, a plurality of spring leaves having an upper end secured in alignment on the rear wall of said box and having a triangular curved portion formed at the intermediate portion thereof; a plurality of key hangers opposing to said spring leaves and pivotably secured in alignment on a lateral axis firmly supported by the side walls of said box, said key hangers each has a foot portion for hanging a key, and having an enlarged triangular protrusion end formed at the rear end thereof for resting on said triangular curved portion; a plurality of actuating rods movably secured in alignment on the upper wall of said box, and opposing downward to said key hangers; and a switch means provided with an inner annular protrusion for pushing one of the actuating rods in order to enable one of said key hangers to be angularly moved to a suitable position in which said foot portion projects upward.

4,706,804
ARTICLE HANGER
David G. Hall, Akron, Ohio, assignor to Taylor Made Products Co., Akron, Ohio
Filed Apr. 25, 1986, Ser. No. 855,955
Int. Cl.[4] B65D *5/50*
U.S. Cl. 206—45.14 **7 Claims**



1. In combination, a container having a raised bead ring on a top end thereof and a dispensing valve within and protruding up from said ring;
- a cover cap for said dispensing valve and bead ring; and
- a support body formed of a continuous elongate strip of cardboard folded to make a two layer structure having a pair of exposed faces and having a flat section and a support flange that extends normally from both of said faces of said flat section at one end thereof, the two layers of said support flange contacting each other and being secured together, said support body and support flange having an article receiving aperture formed therein which receives the top end of said container therein with said support flange lying in close proximity to and below said ring, said bead ring being snuggly engaged by said support flange, said cover cap engaging said bead and bearing on said support flange to aid in retaining said container and support body in assembled relation.

4,706,805
CARRYING CONTAINER FOR RETURNABLE CANS
Patrick J. Becher, 204 Myrtle St., Syracuse, N.Y. 13204
Filed May 27, 1986, Ser. No. 866,742
Int. Cl.[4] B65D *71/00*
U.S. Cl. 206—144 **4 Claims**



1. A top loading carton for beverage containers, the carton being formed from a unitary sheet that includes:
- a rectangular, normally vertical, back wall having a given width;
- a pair of outside panels of equal width foldably joined respectively to opposite side edges of the back wall;
- a pair of front panels foldably joined respectively to opposite side edges of the outside panels, each front panel having a width that is one half that of the back wall, each front panel also having a window that is substantially coextensive with the area of the panel;
- a pair of inside panels foldably joined respectively to opposite side edges of the front panels, said inside panels having the same width as said outside panels;
- said outside, front and inside panels being folded so that two vertically disposed, open topped bins are formed with the back wall being common to both;
- a first locking means for securing the inside panels in back-to-back alignment, said first locking means comprising locking tabs in one of said inside panels which tabs are received in corresponding slots in the other of said inside panels;
- a normally horizontal bottom wall means foldably joined to at least a portion of the bottom edge of each bin;
- a second locking means comprising interlocking tabs and slots for securing said bottom wall means to each of the bins to close the bottom of each bin; and
- a hand engageable handle projecting upwardly from said back wall for carrying said carton.

4,706,806

DESTRUCTIBLE CARTRIDGE FOR ANCHORING RODS OR THE LIKE

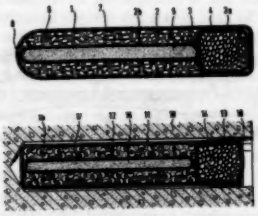
Peter Mauthe, Kleinberghofen, Fed. Rep. of Germany, assignor to Hilti Aktiengesellschaft, Fürstentum, Liechtenstein

Filed Nov. 12, 1985, Ser. No. 797,432

Claims priority, application Fed. Rep. of Germany, Nov. 20, 1984, 3442383

Int. Cl.[4] B65D *81/32*

U.S. Cl. 206—219 10 Claims



1. Destructible multi-chambered cartridge for securing an anchor rod or similar member in a borehole formed in a receiving material where the cartridge includes a settable multi-component mass comprising resin, a hardner and filler members, said cartridge comprising an axially elongated outer casing having a first end and a second end spaced apart in the axial direction with the first end arranged to be inserted first into the borehole, enclosure means lying withing the interior of said outer casing for dividing the interior into a first axially extending portion extending from the first end thereof and a second axially extending portion extending from the second end toward the first end with the first and second portions arranged in series, said second portion having at least filler members therein, said first portion having hardener, resin and filler materials therein, wherein the improvement comprises that said enclosure means lying within said first portion encloses said hardener for maintaining said hardener separate from said resin and filler members in said first portion, and said filler members in said first portion are formed as hollow bodies defining hollow spaces open to the exterior of said hollow bodies.

4,706,807

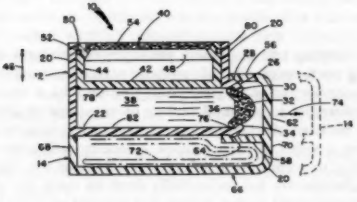
SHOE POLISHING KIT

Kathleen Andres, P.O. Box 1857, Decatur, Ga. 30031

Filed May 1, 1986, Ser. No. 858,192

Int. Cl.[4] B44D *3/40*; B65D *23/12*

U.S. Cl. 206—229 12 Claims



1. A shoe polishing kit, comprising:

(a) polish storage means, comprising:

(i) first sidewalls defining inside walls; and

(ii) a base closing member disposed at one end of said first sidewalls;

(b) plunger means for advancing polish disposed within said sidewalls;

(c) polish disposed in said polish storage means;

(d) an orifice defined proximate to said polish;

(e) support means secured about said orifice and adapted to support a member within said orifice;

(f) a matrix configured and dimensioned to be supported by said support means within said orifice with a portion of said matrix extending from said orifice; and

(g) cap means associated with said support means for being secured to said support means and covering said matrix, wherein said plunger means is positioned adjacent the other end of said first sidewalls and further comprising a shoe polishing rag containing compartment secured to said cap means, and wherein said orifice is defined in said first sidewalls and said compartment is disposed on a side of said closing member which is opposite said plunger means.

4,706,808

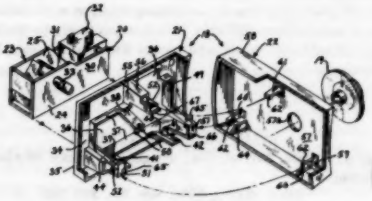
HUMIDISTAT WITH IMPROVED MOUNTING

Timothy L. Guetersloh, Madison, Wis., assignor to Research Products Corporation, Madison, Wis.

Filed Oct. 23, 1986, Ser. No. 922,241

Int. Cl.[4] B65D *85/38*

U.S. Cl. 206—305 15 Claims



1. A humidistat mounting for a generally rectangular humidity sensing cartridge (20), said mounting including a housing (18) comprising:

(a) a longitudinally extending housing base (21) having a peripheral frame (34) surrounding and defining an enlarged rear opening (36) dimensioned for passthrough of a said cartridge (20),

(b) means (38–40) disposed on said frame (34) for latchingly engaging a said cartridge (20) when the latter is passed forwardly through said rear opening (36),

(c) a housing front cover (22),

(d) and cooperative means (59–61, 44, 45, 55) disposed on said front cover (22) and said base (21) for joining said cover to said base.

4,706,809

PACKAGING CONTAINER FOR AN ELECTRIC MOTOR

H. Lee Halsell, Ft. Smith, Ark., assignor to The Mead Corporation, Dayton, Ohio

Filed Sep. 12, 1986, Ser. No. 907,057

Int. Cl.[4] B65D *85/68*

U.S. Cl. 206—319 3 Claims

1. A packaging container having side, end, and top walls and arranged to anchor at least one packaged item therein against substantial jostling movement comprises an end flap foldably joined to each end edge of each of said side walls, a tab foldably joined to each end edge of said top wall, means disposed within the container and defining positioning means including a main panel secured by adhesive in flat face contacting relation to said end flaps and to the associated tab at each end of the container, a diagonal panel foldably joined to each end edge of each of said main panels, and side panels foldably

joined to each of said diagonal panels and secured by adhesive means in flat face contacting relation to said side walls, said positioning means having a support edge spaced from the bottom of the container, the space between said support edge

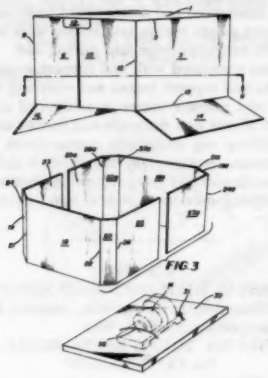


FIG. 3

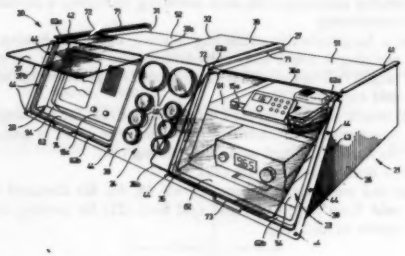
and said bottom being adapted to receive an element associated with the packaged item in contacting relation with said edge, a pair of bottom flaps foldably joined respectively to the bottom edges of said side walls, and means for securing said bottom flaps closed.

4,706,810

BOAT CONSOLE SYSTEM

Peter J. Petrilli, Miami, Fla., assignor to Mako Marine, Inc., Miami, Fla.

Filed May 2, 1986, Ser. No. 858,738
Int. Cl.[4] B65D *1/22*
U.S. Cl. 206—320 **37 Claims**



1. A portable equipment carrier system for boats and the like, comprising:

a receiving part adapted to receive one or more equipment carrier modules, said receiving part having means formed at one end thereof for engaging one or more equipment carrier modules and for preventing movement of the one or more equipment carrier modules within the receiving part in all but one direction;

one or more equipment carrier modules for receiving and supporting equipment to be used on a boat; and

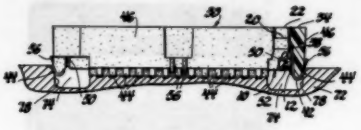
fastener means adjacent the opposite end of said receiving part for releasably fastening said one or more equipment carrier modules in said receiving part whereby each of said one or more equipment carrier modules and equipment supported therein can be readily mounted in and removed from said receiving part as a unit.

4,706,811

SURFACE MOUNT PACKAGE FOR ENCAPSULATED TAPE AUTOMATED BONDING INTEGRATED CIRCUIT MODULES

James E. Jung, Westfield; Mark A. Koors, and Phillip A. Lutz, both of Kokomo, all of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 3, 1986, Ser. No. 835,199
Int. Cl.[4] B65D *73/02*
U.S. Cl. 206—331 **3 Claims**



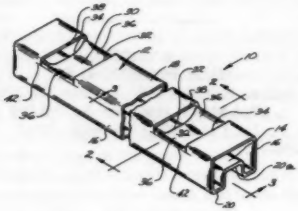
1. In an integrated circuit package having closely spaced external leads subject to unwanted deformation before use, the improvement comprising a lead-forming and protective member made of a nonconductive material affixed to said package over said leads and cooperating with conformations on said leads to retain the leads in predetermined disposition, said protective member having a surface facing the package and projections on that surface for maintaining the leads mutually separated, said external leads contacting at least one edge of that surface and closely wrapping around an adjacent end of said protective member to provide conformation on said external leads such that the leads engage the adjacent end of the protective member to enhance resistance to unwanted deformation.

4,706,812

SHIPPING AND DISPENSING PACKAGE FOR A SERIES OF ARTICLES

Thomas S. Spinelli, Attleboro, and Edward J. Deras, Sutton, both of Mass., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 13, 1982, Ser. No. 449,082
Int. Cl.[4] B65D *75/00, 85/30*
U.S. Cl. 206—332 **4 Claims**



1. A shipping and dispensing package comprising a shape-retaining open-ended tube of synthetic plastic material having a tube periphery of an original configuration with a cross-section conforming to a lateral outline of an article to define a tubular package chamber of corresponding cross-section for receiving a series of such articles in side-by-side relation to each other to permit the articles to be shipped in the tube and to be subsequently fed sequentially from an open end of the tube, characterized in that at least one integral segment of the tube material extending around part of the tube periphery adjacent to and spaced from at least one end of the tube is separated from the tube material along two opposite sides of the segment, the opposite ends of the segment are integrally connected with the tube material at locations spaced from each other at facing opposite sides of the tube periphery, and the

integral segment is deformed out of the original configuration of the tube periphery to leave an opening in the tube periphery and to extend across the tubular chamber between said opposite sides of the tube periphery with one of said sides of the segment disposed for intercepting articles to be fed from the chamber through said open tube end and with the width of the segment oriented generally parallel to the axis of the tubular chamber for supporting said one side of the segment and positively blocking feeding of articles from said open tube and, the synthetic plastic material in the segment at the ends of the segment being deformed beyond the elastic limit of the material for elongating the segment end portions so that the segment inclines down into the chamber from said facing opposite sides of the tube periphery and extends across a selected portion of the tubular chamber so that movement of the segment back into said opening due to material memory is substantially retarded, the segment being movable radially outward from the tubular chamber into said opening by use of a tool for selectively permitting free feeding of articles from said open tube end.

4,706,813

CUBOID CONTAINER FOR ARTICLES AND HINGE AND PIVOT-LIMITING MEANS THEREFOR

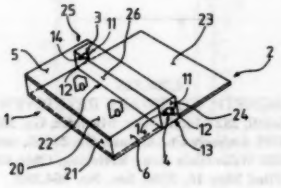
Alfred Schneider, Hoehnheim, France, and Joachim Eberhard, Kippenheim, Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Filed Jan. 15, 1987, Ser. No. 3,660

Claims priority, application Fed. Rep. of Germany, Jan. 18, 1986, 8601147[U]

Int. Cl.[4] B65D *85/67, 51/04*

U.S. Cl. 206—387 **22 Claims**



1. Cuboid container for articles, particularly recording media, having a base part which possesses a rear wall, a base wall and side walls, and a lid part which consists of at least one lid wall provided with lid sidewall parts which extend over at least some of the length of the sides of the lid wall, at least a slight pre-stress existing between the side walls of the lid part and of the base part, and hinging devices and pivot-limiting devices being provided on the side walls, wherein each hinging device is designed as

(a) a central hinge pin and a corresponding hole and

(b) an approximately circular projection and a corresponding recess,

(c) the hinge pin and projection and the hole and recess, respectively, being arranged concentrically to one another,

and the pivot-limiting device being designed as at least one web which is substantially radial to the hinge pin and groove which fits the said web.

4,706,814

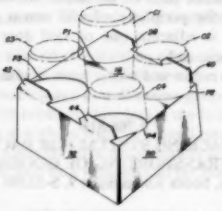
MULTIPACK CARTON WITH AUTOMATIC PANEL POSITIONING TABS

Gary Baugus, Atlanta, and James R. Oliff, Austell, both of Ga., assignors to The Mead Corporation, Dayton, Ohio

Filed Jul. 28, 1986, Ser. No. 889,668

Int. Cl.[4] B65D *75/00*

U.S. Cl. 206—427 **6 Claims**



1. A carton for a plurality of containers comprising a rectangular main panel having a plurality of apertures for receiving and retaining said containing, side wall panels foldably joined to opposing side edges of said main panel, end panels joined to said side wall panels and folded into overlapping relationship, and flanking panels hinged at substantially straight fold lines located at the remaining side edges of said main panel, each of the flanking panels having side edges which are unattached to the side edges of the side walls panels, each of said flanking panels having at least one integral positioning tab extending into and interrupting the area defined by an adjacent container receiving aperture, said positioning tab being effective to induce pivoting of its associated flanking panel about the hinged connection thereof with said main panel when a container is inserted into said adjacent container receiving aperture, so that the flanking panels are brought into an upright relationship with respect to the body portions of the container that is substantiliy the same as th upright relationship of the side wall panels when the carton is formed about the containers.

4,706,815

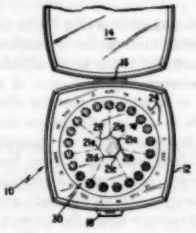
DISPENSING CONTAINER FOR TRIPHASIC

H. Edward Curtis, Perkasie, and Thomas J. Gaffney, West Chester, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Aug. 23, 1982, Ser. No. 410,757

Int. Cl.[4] B65D *83/04*

U.S. Cl. 206—531 **9 Claims**



1. A pharmaceutical dispensing container comprising two elements:

A. a blister pack of predetermined shape containing a plurality of dose forms in blisters in multiples of seven arranged in sequential order of use circumferentially adjacent the edge of said blister pack;

1. a septagonal opening in the center of said blister pack; and

B. a compact carrying case having

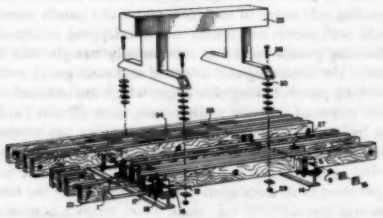
1. a base having a plurality of openings arranged in the same pattern as said dose forms in said blister pack;
2. a recessed area adapted to receive said blister pack;
3. a septagonal post in the center of said recess adapted to engage said septagonal opening of said blister pack;
4. indicia of the days of the week marked on said base adjacent the periphery of said recess, whereby each indicium is adjacent one of said dose forms of said blister pack; and
5. means to retain said blister pack in said case.

4,706,816

MODULE PACKING SYSTEM FOR PACKING AND TRANSPORTING OF GOODS

Bengt Fjällström, Södra Kungsvägen 9, S-52200 Tidaholm, Sweden

Filed Nov. 8, 1985, Ser. No. 796,441
Claims priority, application Sweden, Nov. 8, 1984, 8405599
Int. Cl.[4] B65D *85/68*
U.S. Cl. 206—525 **6 Claims**



3. A modular packing system for packing and transporting heavy goods, said device comprising:

an adjustable frame having a plurality of parallel spaced apart bottom beams defining a bottom portion of said system,

a plurality of parallel spaced apart upper beams defining an upper portion of said system, said plurality of parallel upper beams extending parallel to said plurality of parallel bottom beams and spaced from said bottom beams in a direction perpendicular to the direction in which said upper beams and said bottom beams extend, and

a plurality of vertical beams each of which is attached at a first end thereof to a respective one of said bottom beams and at a second end thereof to a respective one of said upper beams;

adjustment means attached to said frame for fixing each of said plurality of bottom means in position relative to one other, said adjustment means being adjustable for allowing the spacing between adjacent ones of said plurality of bottom beams to be adjusted thereby allowing said frame to be adjustable in size in a dimension corresponding to a direction that is transverse to the direction in which said plurality of bottom beams and upper beams extend, said adjustment means comprising a plurality of blocks to which said plurality of bottom beams are mounted, and

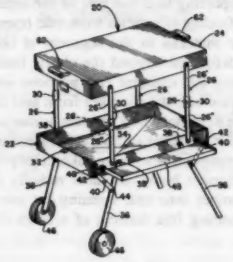
each of said blocks comprising a flange on which at least one of said plurality of bottom beams lies, a guide on the bottom of said flange for engaging a supporting beam extending in said transverse direction, two support means fixed to and extending from said flange on opposite sides of said at least one bottom beam for supporting said at least one bottom beam, and securing means for adjustably mounting said block on the supporting beam in said transverse direction.

4,706,817

PORTABLE FOOD HOLDING DEVICE

Glen Greathouse, 2980 Pontius Rd., Uniontown, Ohio 44685

Filed Jul. 7, 1986, Ser. No. 882,786
Int. Cl.[4] A45C *11/20*; F24C *1/16*
U.S. Cl. 206—545 **5 Claims**



1. A portable food storage device comprising an insulated upper half and a lower half, said upper, or cover half being connected to said lower, or food holding half by support arms such that the two halves can be moved apart from each other, thus permitting access to the contents of said lower half and simultaneously providing a canopy over said lower half, or such halves can be moved adjacent to each other, protectively covering and insulating said lower half and its contents, wherein each of said support arms comprise upper and lower arms joined at pivot points optionally made inoperable by sleeve members disposed thereover when said arms are to be disposed in an upper cover section supporting position, and slidably retracted therefrom when said upper cover section is to be collapsed, and wherein said lower half has attached thereto collapsible legs which may be deployed to support said lower half in table fashion above the surface over which said device is located.

4,706,818

MAGNETIC FLATWARE RETRIEVER

Stephen W. Zutell, 282 Martin Way, Marietta, Ga. 30064; David A. Wade, 4595 Amberly Ct., Atlanta, Ga. 30360, and James V. Hanson, 1005 Willowdale Ave., Kettering, Ohio 45429

Filed May 16, 1986, Ser. No. 864,285
Int. Cl.[4] B03C *1/26*
U.S. Cl. 209—636 **7 Claims**

1. A magnetic device for preventing flatware from falling into a food disposer machine, comprising,

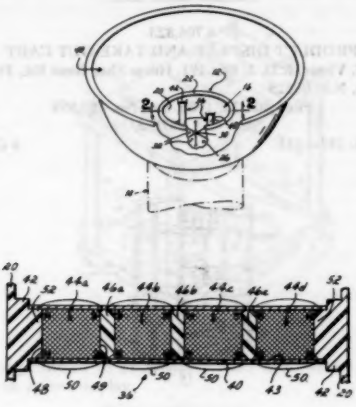
a non-magnetic collar adapted to be mounted over the mouth of the machine, said collar having an annular wall defining a vertical opening for the passage of food scraps into the machine, and

at least two magnetic elements mounted by said collar in said opening, each element extending across said opening from one side thereof to an opposite side,

each element comprising a round, smooth, hollow, cylindrical non-magnetic sleeve containing a series of permanent magnets aligned axially within it, said magnets separated from each other by non-magnetic spacers,

said collar having mounting means projecting into said opening from said wall, said mounting means positioned and sized for seating and capturing the ends of the respective sleeves, said collar deforming outwardly in a direction parallel to said elements and away from said ends if a

compressive force is applied thereto transversely to said elements, thereby to enable said sleeves to be seated on



and captured by said mounting means when the compressive force is removed.

4,706,819

SUPPORTING ASSEMBLY

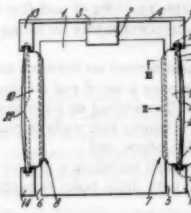
Kenneth F. Elliott, Ferring, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 2, 1986, Ser. No. 903,042

Claims priority, application United Kingdom, Sep. 2, 1985, 8521774

Int. Cl.[4] A47F *7/00*

U.S. Cl. 211—41 **14 Claims**



1. a supporting assembly for supporting a body having approximately a predetermined dimension,

comprising frame means and at least one support member movably mounted in the frame means, the support member having an elongate groove extending along and into the support member to receive first co-operating edge means of the body for supporting the body edgewise,

wherein the support member is rotatable relative to the frame means within a restricted range of positions about an axis which extends substantially parallel to the groove and which is substantially in the plane in which the groove extends into the support member, said axis being spaced from the groove, and wherein said axis is movable in said plane,

the assembly further comprising bias means for providing a bias in said plane to resiliently urge the support member against the body to be supported,

wherein the groove is shaped to maintain firm engagement with said edge means for rotational positions of the support member within said restricted range,

wherein the assembly comprises further support means in the frame means for supporting a side of the body remote from the first edge means, the distance between the first edge means and said side being approximately said predetermined dimension,

and wherein the frame means comprise first locating means which are co-operable with second locating means on said body disposed generally at an end thereof in the direction in which the groove extends along the support member to locate at least the portion of the body in the region of the first locating means substantially in a predetermined position,

whereby to permit said co-operating edge means, received in the groove, to be located anywhere within a first range of positions extending in a first direction generally normal to said plane with relatively low bias in the first direction and to be located anywhere within a second range of positions extending in a second direction generally in said plane and normal to said axis with relatively larger bias in the second direction.

4,706,820

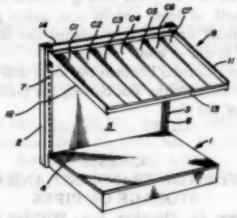
GRAVITY FEED SHELF FOR STORE GONDOLAS

William S. Spamer, Roswell, and David S. Leverette, Hartwell, both of Ga., assignors to The Mead Corporation, Dayton, Ohio

Filed Oct. 17, 1986, Ser. No. 920,214

Int. Cl.[4] A47F *7/00*

U.S. Cl. 211—59.2 **7 Claims**



1. A display shelf for mounting on a pair of vertical spaced apart upright posts the spacing between which may vary somewhat, the shelf comprising a frame having front and back cross supports and a pair of side supports interconnected at their ends with the ends of said cross supports to form a rectangular frame and interconnected at their back ends respectively with said upright posts, an inwardly projecting support panel having a transverse slot and formed on at least one of said side supports adjacent the back end thereof, said back cross support being of stepped configuration and including a first transverse strip disposed in a vertical plane and extending between said side supports, and a downwardly projecting tab formed on the lower edge of said first transverse strip at at least one end thereof.

4,706,821

MERCHANDISE DISPLAY AND DISPENSING DEVICE

Mitchell L. Kohls, Greenfield, Wis.; Loren G. Smith, St. Paul, and H. David Zahringer, Minneapolis, both of Minn., assignors to Jockey International, Inc., Kenosha, Wis.

Filed Jul. 17, 1986, Ser. No. 887,065

Int. Cl.[4] A47E *7/00*

U.S. Cl. 211—593 **11 Claims**

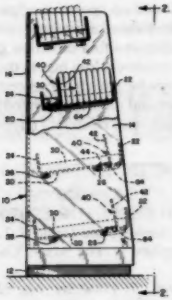
1. In a merchandise display and dispensing device of the type comprising a frame which comprises at least one shelf and a plurality of dividers mounted adjacent to the shelf to divide the shelf into a plurality of compartments, the improvement comprising:

a slot defining portion of the shelf which defines a slot in the

shelf situated between a pair of the dividers, said slot defining portion defining a transparent upper surface;

a pushplate comprising an upstanding section and a guide section oriented parallel to the shelf, said pushplate disposed on the upper surface over the slot between the pair of dividers;

a plurality of low friction glides fixedly secured to the pushplate to bear on the upper surface of the shelf to support the pushplate on the shelf and to slide on the upper surface to reduce sliding friction therebetween;



a pair of guide pins mounted to the pushplate and extending through the slot to guide sliding motion of the pushplate on the shelf, at least one of said guide pins having an enlarged head sized to bear against the shelf to hold the pushplate in place; and

spring means disposed beneath the shelf and coupled to the pushplate through the slot biasing the pushplate toward a first end of the slot.

4,706,822

FRAME FOR THE TRANSPORT AND FOR THE STORAGE OF PIPES

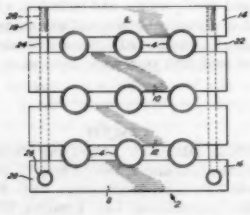
Thomas E. Remp, Jr., Houston, Tex.; Wilfried Dreyfuss, Dorfstrasse 52, D-3111 Eimke, and Kurt Müller, Eicklingen, both of Fed. Rep. of Germany, assignors to Wilfried Dreyfuss and Thomas Remp, both of, Fed. Rep. of Germany

Division of Ser. No. 400,096, Jul. 20, 1982. This application Dec. 20, 1985, Ser. No. 811,695

Claims priority, application Fed. Rep. of Germany, Jul. 22, 1981, 3128840

Int. Cl.[4] A47F *7/00*

U.S. Cl. 211—59.4 **4 Claims**



1. Frame for the transport and storage of pipes having several profiled frame parts arranged one over another, and having upper and lower frame parts connectable with one another and middle frame parts, said upper and lower frame parts being connectable with one another by at least one bolting rod means, the improvement comprising, the bolting rod means having a crosspiece, said lower frame parts having laterally disposed thereon a transverse bore for detachably receiving the crosspiece of said bolting rod means, and said bolting rod mean being rotatably borne within said lower frame parts.

4,706,823

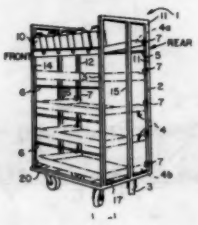
PRODUCT DISPLAY AND TAKE-OUT CART

John G. Visser, R.D. 2, Box 191, Horse Shoe Bend Rd., Frenchtown, N.J. 08825

Filed Jul. 22, 1986, Ser. No. 887,959

Int. Cl.[4] A47F *3/14*

U.S. Cl. 211—133 **6 Claims**



1. A tray for a point-of-sale display cart formed as by fiberglass reinforced polyester plastic molded into a tray structure comprising:

a rectangular shaped flat bottom having a front edge, a rear edge, and a pair of side edges;

the underside of said bottom having first and second sets of vertical ribs, the ribs of the first set extending in a direction between the front and rear edges and the ribs of the second set extending in a direction between the side edges and intersecting ribs of the first set;

the top side of said bottom having a plurality of parallel beads, each bead extending from said rear edge toward said front edge and terminating at a point spaced from the front edge;

support means formed on ribs of said first set for receiving pivot means to support the tray for tilting motion about an axis;

a pair of ribs of said second set between said rear edge and said axis each having a metal rod molded therewith;

a vertical front wall extending up from said front edge;

a pair of product-retaining side walls respectively extending up from said side edges; and

said vertical front wall including a groove extending along said front edge with drain holes respectively at opposite ends thereof.

4,706,824

VARIABLE SIZED FREE STANDING PROMOTIONAL DISPLAY

John E. Mercer; R. Christopher Kidd, both of New York, N.Y., and Milton Merl, Belleville, N.J., assignors to Marlboro Marketing, Inc., New York, N.Y.

Filed Mar. 25, 1986, Ser. No. 843,538

Int. Cl.[4] A47F *5/00*

U.S. Cl. 211—188 **15 Claims**

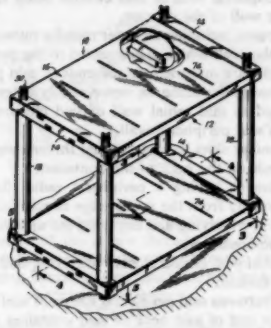
1. A variable size free standing promotional display to attractively present merchandise in a store, away from fixed displays, which comprises:

(a) a shelf, said shelf including opposite end members each having a receptacle;

(b) a beam member including vertically spaced top and bottom walls intergrally formed of manually foldable cardboard shipping carton component web and means to detachably secure the beam member to the end members in order to form the shelf;

(c) means to allow construction of a configuration of at least

two shelves in parallel spaced relationship to each other, whereby the promotional display may be rapidly yet



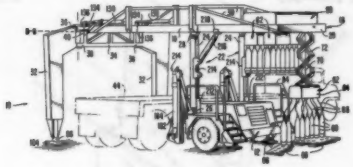
stably formed to pleasingly present merchandise away from a fixed display.

4,706,825

PORTABLE FOLDING BRIDGE CRANE

Bruce S. Johnson, Dallastown, Pa., assignor to Harsco Corporation, Wormleysburg, Pa.

Filed May 22, 1985, Ser. No. 736,834
Int. Cl.[4] B66C *23/26*
U.S. Cl. 212—182 **20 Claims**



1. Crane apparatus comprising a wheeled unit having a tongue assembly adapted for connection to a vehicle to enable towing of the unit; a rail assembly carrying a movable crane assembly thereon; a support structure pivotally connected both to the unit and to the rail assembly; first means for pivoting the support structure with respect to the unit to raise and lower the rail assembly; leg means pivotally connected to the rail assembly at an end region thereof; and second means for pivoting the leg means between a stowed position at which the leg means is folded adjacent to the rail assembly and an operating position at which the leg means is folded away from the rail assembly to support the end region of the rail assembly above the ground, and wherein the rail assembly comprises a pair of spaced parallel longitudinally extending rails, said leg means comprises two legs, each leg pivotably connected at an end region of a corresponding one of said rails.

4,706,826

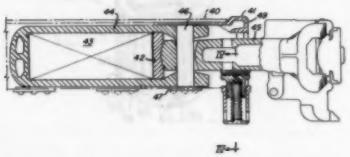
STRIKER CARRIER HAVING AN ADJUSTABLE WEAR PLATE FOR A RAILWAY COUPLER

William O. Elliott, and Mary A. Glover, both of Pittsburgh, Pa., assignors to McConway & Torley Corporation, Pittsburgh, Pa.

Filed Apr. 22, 1985, Ser. No. 725,664
Int. Cl.[4] B61G *9/00*
U.S. Cl. 213—61 **4 Claims**

1. A carrier supported in a chamber of a striker to resiliently position a railroad car coupler at an adjustable preestablished elevation for horizontal swing of the coupler, said carrier comprising,

a bottom carrier section resiliently supported against vertically located retainer lugs in said chamber, said bottom carrier section including a load-bearing face surface having prong openings therein underlying said railroad car coupler, a spacer having a predetermined thickness and prong openings aligned within the prong openings in the bottom carrier section, and



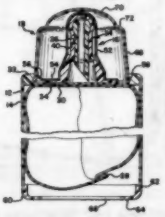
an upper carrier casting comprised of wear-resistant material for forming a horizontal coupler support face, said upper carrier casting including depending prongs having a consistent cross section vertically to permit restricted freedom of motion to travel in a vertical direction for extending through the prong openings in said spacer and into the prong openings of said bottom carrier section irrespective of the predetermined thickness of the spacer.

4,706,827

CONTAINER SUCH AS A NURSING CONTAINER, AND PACKAGING ARRANGEMENT THEREFOR

James L. Cabernoch, Cary, and Leonard A. White, Gurnee, both of Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Continuation of Ser. No. 599,295, Apr. 12, 1984, abandoned. This application Dec. 27, 1985, Ser. No. 815,299
Int. Cl.[4] A61J *9/00, 9/08*
U.S. Cl. 215—11.3 **18 Claims**



1. A nursing container comprising:

a substantially rigid elongated hollow sleeve;

a sealed flexible pouch of liquid disposed within said sleeve, said sealed flexible pouch defining by itself a sealed internal compartment within said sleeve;

a nipple assembly attached to said sealed flexible pouch for dispensing the contents thereof; and

a substantially rigid base carrying said nipple assembly and closing one end of said sleeve.

10. A container for fluid, comprising:

a substantially rigid elongated hollow sleeve;

a sealed flexible pouch of liquid disposed within said sleeve, said sealed flexible pouch defining by itself a sealed internal compartment within said sleeve;

an access assembly attached to said sealed flexible pouch for dispensing the contents thereof; and

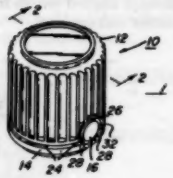
a substantially rigid base carrying said access assembly and closing one end of said sleeve.

4,706,828

TAMPER RESISTANT CAP

Gerald Zinnbauer, Toledo, Ohio, assignor to Kardon Industries, Philadelphia, Pa.

Filed Sep. 19, 1986, Ser. No. 909,400
Int. Cl.[4] B65D *41/34*
U.S. Cl. 215—246 **8 Claims**



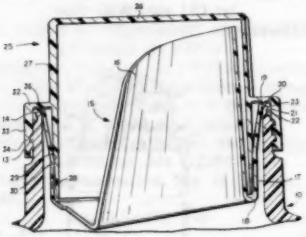
1. A tamper-evident closure for a container, comprising:
(a) a molded plastic cap having internal threads capable of mating with an externally threaded container opening;
(b) detachable retention means for detachably holding said cap in place over said container opening; and
(c) a removable tamper indicator integral with said cap and said detachable retention means located below said cap internal threads, whereby said indicator is detached from said cap and said detachable retention means when said cap is removed from said container opening.

4,706,829

LIQUID CONTAINING AND DISPENSING PACKAGE

Ernest L. Li, Toledo, Ohio, assignor to Owens-Illinois Closure Inc., Toledo, Ohio

Filed Feb. 7, 1986, Ser. No. 827,299
Int. Cl.[4] B65D *41/00*
U.S. Cl. 215—354 **16 Claims**



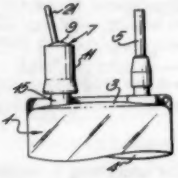
1. A liquid containing and dispensing package comprising
a hollow plastic container having a neck with external threads thereon,
a fitment,
snap-on interengaging means between the fitment and the neck,
said fitment having an inner wall defining a pouring lip extending from within the neck axially beyond the interengaging means and beyond the end of the neck,
said fitment including an outer annular wall connected to the inner wall by an annular portion at the end of the inner wall of the fitment within the neck,
said outer annular wall of said fitment extending from the end of the inner wall within the neck and terminating at said interengaging means,
said annular connecting portion of said fitment having a drain opening therethrough,
said outer wall of said fitment having an inner surface,
a cup-shaped closure comprising a top wall and a peripheral wall extending from the top wall,
said peripheral wall of said closure extending axially inwardly between the inner wall and the outer wall of the fitment to a point adjacent the lower ends of said inner wall and said outer wall,
said peripheral wall of said closure being spaced from the inner wall of the closure,
said closure including an outer radially outwardly extending annular wall which is connected to the peripheral wall of the closure intermediate the ends of said peripheral wall,
said closure including an outer axially extending skirt connected to said radial wall of said closure and is spaced from said peripheral wall,
said annular skirt having internal threads engaging external threads on the neck of the container,
said fitment having a peripheral radial flange extending outwardly from the upper edge of said outer wall of said fitment overlying and engaging the upper end of the neck of the container,
said radial wall of said closure overlying said radial flange of said fitment,
means between said peripheral flange of said fitment and the upper end of said neck of said container defining a seal, and
means between said radial wall of said closure and said radial flange of said fitment defining a seal.

4,706,830

VACUUM BOTTLE WITH PRESSURE INDICATOR

Mark V. Wareing, Embsay, England, assignor to Johnson & Johnson Products, Inc., New Brunswick, N.J.

Filed Jun. 21, 1982, Ser. No. 390,412
Claims priority, application United Kingdom, Jun. 24, 1981, 8119435
Int. Cl.[4] A61M *1/00*; B65D *47/00, 51/00*
U.S. Cl. 215—365 **8 Claims**



1. A vacuum drainage bottle having a chamber for receiving fluids drained from a patient comprising, a connector to receive fluids from a patient, and a pressure indicator separate from said connector and separated from communication with said chamber by sealing means isolated from the atmosphere and which are releasable prior to connecting said bottle to a wound drainage tube in order to indicate the pressure in said bottle.

4,706,831

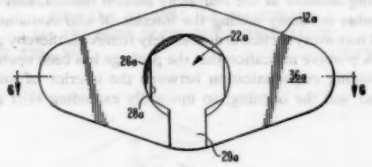
ELECTRICAL BOX WITH LATERALLY OPEN POLYGONAL BORE

Howard M. Williams, Jr., Emmaus, Pa., assignor to Hubbell Incorporated, Orange, Conn.

Filed Feb. 5, 1987, Ser. No. 11,245
Int. Cl.[4] F16B *39/00*
U.S. Cl. 220—3.2 **22 Claims**

1. An electrical box for supporting a device by an externally threaded screw, the screw having threads with a crest diameter and a root diameter, comprising:
a boss integrally formed with the box and having a front face;
a first straight self-tapping bore extending inwardly of said boss from said front face for receiving the screw, said bore having a substantially regular polygonal cross-sectional configuration with an even number of sides, said bore

having a first diameter across corners of said polygonal configuration slightly larger than the crest diameter of the screw threads, and a second diameter across flat sides of



said polygonal configuration slightly smaller than the crest diameter of the screw threads and slightly larger than the root diameter of the screw threads; and

a slot extending laterally from said bore and into said boss.

4,706,832

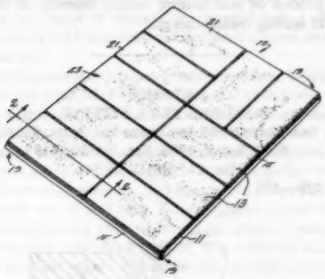
HOME BAKER'S HEARTH ACCESSORY FOR BAKING OLD WORLD BREAD IN A CONVENTIONAL HOME OVEN

Salvatore Citino, Potomac, Md., assignor to Salday Products Corporation, Rockville, Md.

Continuation of Ser. No. 711,043, Mar. 12, 1985, abandoned. This application Sep. 17, 1986, Ser. No. 908,339

Int. Cl.[4] A21B *3/15*

U.S. Cl. 220—66 **19 Claims**



1. A homebakers' hearth for baking free-form bread in a common wall oven or kitchen stove to achieve a quality of bread comparable to that achievable in a commercial brick oven, said hearth comprising:

an aluminum tray defining an upper, substantially planar surface, said tray having an upwardly extending edge at the outer peripheries thereof, said edge surrounding and adjoining said upper surface; and

a plurality of individual quarry tiles removeably disposed on said aluminum tray upper surface and each abutting said upwardly extending edge, said plurality of quarry tiles adjoining one another and covering substantially the entire area of said tray upper surface.

4,706,833

THERMOPLASTIC CONTAINER

William H. Korcz, Houston, Tex., and Surendra N. Singhal, Tulsa, Okla., assignors to Shell Oil Company, Houston, Tex.

Filed Sep. 22, 1986, Ser. No. 909,537

Int. Cl.[4] B65D *53/00*

U.S. Cl. 220—67 **7 Claims**

1. A food or beverage thermoplastic container, to which a metal end can be attached without the necessity of flaring the thermoplastic sidewall of said container, which comprises:

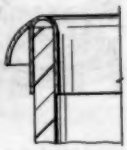
thermoplastic container side walls having an upper edge and a lower edge; and

a ring clip which is bonded to said upper edge of said thermoplastic container sidewall by some suitable adhesive, said ring clip comprising:

a first wall having a first edge and a second edge;

a second wall having a first edge and a second edge, said second wall being positioned outside of and adjacent to said first wall;

a third annular wall positioned substantially perpendicular to said first wall and said second wall, and having an inner



and outer edge, where said inner edge is connected to said first edge of said first annular wall, and said outer edge is connected to said first edge of said second annular wall;

a fourth annular wall having an inner and outer edge, where said inner edge is connected to said first edge of said second annular wall; and

wherein said first and second annular walls are arranged concentric to a central longitudinal axis.

4,706,834

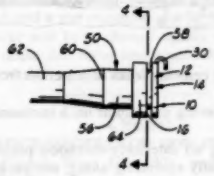
COUPLER COVER APPARATUS

Michael K. Farney, 1613 Grinnell, and Jackson Kile, 2305 S.W. Loop Rd., both of Perryton, Tex. 79070

Filed Feb. 6, 1987, Ser. No. 12,138

Int. Cl.[4] B65D *51/00*

U.S. Cl. 220—230 **27 Claims**



1. An apparatus for protecting the open end of the female half of a metallic hydraulic line coupler, comprising:

a magnetic cover member releasably attachable to said female half of said coupler by the exertion of magnetic force thereon, said cover member having a first surface which completely covers said open end of said female half when said cover member is magnetically attached thereto.

4,706,835

CLOSURE WITH TOP CUT TAMPER EVIDENT FEATURE

Walter J. Kreiseder, Barrington, Ill., assignor to Courtesy Mold & Tool Corporation, Wheeling, Ill.

Filed Apr. 16, 1987, Ser. No. 38,893

Int. Cl.[4] B65D *51/22*

U.S. Cl. 220—258 **12 Claims**

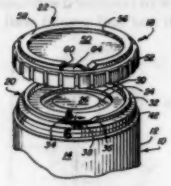
1. A closure for a container comprising:

a stationary container end portion formed integral with said container;

a raised annular rib portion integral with said end portion and having an open bottom, a first truncated end and a second inclined end, said ends separated by a weakened hinge portion; and

an overcap portion attached to said container end portion

for coaxial rotation thereabout, said overcap having a raised, open-bottomed, closed top channel with a first open truncated end and a second, inclined end forming a knife blade, said channel configured and dimensioned to overlay and engage said annular rib, so that as said over-



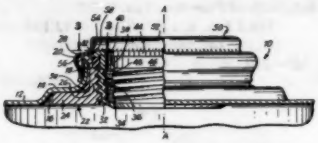
cap is rotated about said end portion, said blade engages and severs said rib and moves said severed rib up said incline, thus severing said end portion and said overcap from said container, said closure being retained on said container by said weakened hinge portion only.

4,706,836

LEAK-RESISTANT DRUM SEALS

Eugene Greck, Westfield, N.J., assignor to Allen-Stevens Drum Accessories Corp., Somerset, N.J.

Filed Jan. 23, 1987, Ser. No. 6,126
Int. Cl.[4] B65D *51/16, 51/18*
U.S. Cl. 220—256 **11 Claims**



1. A drum seal for resisting leaks of materials from a shipping drum, comprising:

(a) a drum head having an annular neck surrounding a longitudinal axis;

(b) a base having an interiorly-threaded portion mounted within, and axially extending along, the neck;

(c) a plug having an exteriorly-threaded portion mounted within, and threadedly engaging, the interiorly-threaded portion of the base, said plug having a radially-extending collar which is located axially adjacent the exteriorly-threaded portion;

(d) a seal mounted between, and sealingly engaging, the collar and the base to resist leakage of materials past the threadedly-engaged interiorly- and exteriorly-threaded portions;

(e) an overcap mounted on the drum head and confining the base, plug and seal; and

(f) means for resisting rotation of the plug about the axis during shipping of the drum, including locking means on the overcap, and co-acting means on the collar and cooperatively lockingly engaging the locking means to resist rotation of the plug relative to the overcap.

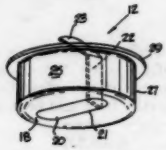
4,706,837

TAMPER-RESISTANT PACKAGE

Carl W. Cooke, Sedalia, Colo., assignor to Inventive Packaging Corporation, Castle Rock, Colo.

Filed Mar. 24, 1986, Ser. No. 842,902
Int. Cl.[4] B65D *39/04*
U.S. Cl. 220—270 **4 Claims**

1. A tamper-resistant package consisting of a container having an interior and an opening; a removable closure and sealing means, said sealing means comprising a sealing member disposed in the interior of said container for sealing the opening, said sealing member including a tear-away section defined by a score line on said sealing member and a tab affixed to said sealing member at the tear-away section thereof, said sealing member normally sealing the interior of said container until said tear-away section is deliberately removed, thereby providing a positive indication that the package has been opened and providing communication between the interior of said container and the opening; an upwardly extending skirt portion



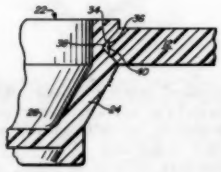
integrally formed with said sealing member, said skirt portion being received in the opening of said container and cooperating with the inner walls of the container interior for carrying and retaining said sealing member therein; a pair of spaced annular ribs on the outer surface of the skirt portion of said sealing means which define therebetween an annular groove; and a corresponding cooperating annular rib on the inner surface of the interior of said container which is received in the annular groove of said sealing means, thereby to carry and retain said sealing means therein.

4,706,838

MOLDED PULL FITTING

John W. Von Holdt, 6864 Lexington La., Niles, Ill. 60648

Filed Sep. 8, 1986, Ser. No. 904,619
Int. Cl.[4] B65D *17/34*
U.S. Cl. 220—270 **7 Claims**



1. In a molded wall which carries a pull fitting, the improvement comprising, in combination:

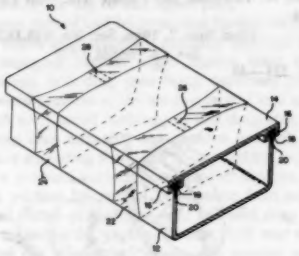
said pull fitting defining a tubular wall having an axis transverse to said molded wall, said tubular wall being integrally connected to said molded wall outside of said tubular wall by an annular, thin film of wall material integrally connected to both said tubular wall and outside molded wall; said tubular wall also defining, on its outer surface, an annular groove proportioned in size and shape to receive in snap-fit relation an annular edge of said outside, molded wall which is exposed upon severing of said annular, thin film, and removing of said fitting, to permit reattachment of said fitting to the molded wall, the annular groove and annular edge of the outside, molded wall being proportioned to provide an annular, enclosed space therebetween when connected together, whereby remains of said annular, thin film may reside therein without interfering with the seal between said annular groove and annular edge.

4,706,839

CLOSURES AND METHODS OF CLOSURE FOR A STERILIZATION CONTAINER SYSTEM

Jerry L. Spence, Kirkland, Wash., assignor to Instrumed, Inc., Kirkland, Wash.

Filed Oct. 31, 1986, Ser. No. 925,412
Int. Cl.[4] B65B *53/00, 31/00;* B65D *81/18*
U.S. Cl. 220—315 8 Claims



1. A method of closure for a sterilization container system comprising a base, a lid, and a gasket means adapted to provide a selectively releasable seal with at least one of said lid and said base; wherein said method comprises the steps of:

a. encircling said base and said lid with at least one band of shrinkable material;

b. placing said sterilization container system bearing said at least one band of shrinkable material into a device for sterilizing said sterilization container system and its contents; and

c. exposing said sterilization container system bearing said at least one band of shrinkable material to at least one sterilant within said device for sterilizing until said sterilization container system is sterilized and until said at least one band of shrinkable material shrinks to the point where it urges said base, lid and gasket firmly together to provide a selectively releasable microorganism proof seal between at least two of said base, lid and gasket means to prevent microorganisms from entering an interior space of said sterilization container system; and wherein said at least one sterilant within said device for sterilizing acts to sterilize said sterilization container system and its said contents and acts to simultaneously shrink said at least one band of shrinkable material.

3. A method of closure for a sterilization container system comprising a base, a lid and a gasket means adapted to provide a selectively releasable seal with at least one of said lid and said base; wherein said method comprises the steps of:

a. encircling said base and said lid with at least one band of shrinkable material; and

b. exposing said at least one band of shrinkable material to a shrink inducing agent until said at least one band of shrinkable material shrinks to the point where it urges said base, lid and gasket means firmly together to provide a selectively releasable microorganism proof seal between at least two of said base, lid and gasket means to prevent microorganisms from entering an interior space of said sterilization container system.

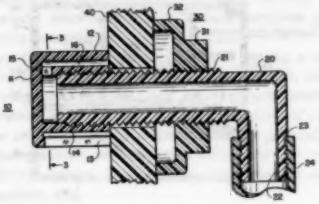
5. A closure means in combination with a sterilization container system comprising a base, a lid, and a gasket means adapted to provide a selectively releasable seal with at least one of said lid and said base; wherein said closure means comprises at least one band of shrinkable material encircling said base and said lid; said at least one band being shrunk to such a degree that it urges said base, lid and gasket means firmly together providing a selectively releasable microorganism proof seal between at least two of said base, lid and gasket means to prevent microorganisms from entering an interior space of said sterilization container system.

4,706,840

BAFFLED TANK VENT

David M. Thompson, 803 Mantoloking Rd., Brick Town, N.J. 08723

Filed Mar. 23, 1987, Ser. No. 29,193
Int. Cl.[4] B65D *51/16*
U.S. Cl. 220—373 5 Claims



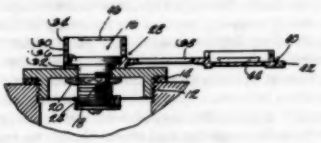
1. A vent, extending through a hull, for a tank within said hull comprising a continuously-threaded tubular unit extending through a hole in said hull well above the waterline; said tubular unit having an outer end projecting outside said hull, and an inner end projecting inside said hull; a baffled vent cap having a first, outer, tubular portion, and a second, inner, tubular portion concentric with, and spaced from, said first, outer, tubular portion; an outer cap secured to and supporting said outer and inner tubular portions in said spaced, concentric relationship, and maintaining an air gap between said tubular portions; said inner tubular portion being threaded to be attached to the outer end of said continuously-threaded tubular unit; a breather opening through the upper side of said inner tubular portion adjacent to said outer cap for maintaining an air passage between said tubular unit and said air gap; and a breather opening through the lower side of said outer tubular portion for maintaining an air passage between said air gap and the outer air; and a nut engaging the threads of said inner end of said tubular unit to be turned tightly against the inside of said hull to draw said outer and inner tubular portions tightly against the outside of said hull.

4,706,841

LOCK PROTECTOR FOR FUEL CAP

Leonard A. Grajek, West Allis, Wis., assignor to Velvac, Inc., New Berlin, Wis.

Filed Jun. 10, 1983, Ser. No. 502,554
Int. Cl.[4] B65D *55/16*
U.S. Cl. 220—375 6 Claims



1. A locking fuel cap comprising

a fuel cap,

a lock including a flanged head and a threaded body extending through a hole in the fuel cap,

a lock nut threaded on said body,

a lock protector including a cup-like body and a cover,

a hole through the bottom of said cup-like body,

the threaded body of the lock passing through the hole in the cup-like body so the head of the lock is drawn against and sealed by said protector body as the lock nut is drawn tight.

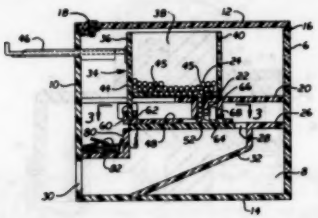
said cover having a tight fit on said protector body to prevent entry of water.

4,706,842

APPARATUS FOR DISPENSING ELONGATED CYLINDRICAL OBJECTS SUCH AS PENCILS

Gus A. Guadagnino, 1539 Fayetteville, Spring Hill, Fla. 33526

Filed Jan. 29, 1987, Ser. No. 8,619
Int. Cl.[4] G07F 11/00; B65H 7/18
U.S. Cl. 221—14 5 Claims



1. Apparatus for dispensing elongated cylindrical objects, such as pencils, each having a predetermined cylindrical axis, said apparatus comprising

housing means including

lateral side portions

a first support panel extending generally horizontally between said lateral side portions and having an aperture therethrough dimensioned to receive and pass therethrough a single said object;

a second support panel positioned below said first support panel and extending generally parallel to said first support panel and having an aperture therethrough dimensioned to receive and pass therethrough said objects; and

a delivery chute extending from adjacent said second support panel aperture to outlet means through at least one of said lateral side portions;

hopper means enclosed within said housing means and supported upon said first support panel for horizontal sliding movement between a first position and a second position, said hopper means including side portions and a bottom portion with said bottom portion having an aperture therethrough for communicating with said first support panel aperture;

manual actuating means extending through at least one of said lateral side portions and comprising an elongated member having one end thereof adapted for grasping and movement by a user of the dispensing apparatus and the other end thereof operatively connected to said hopper means for sliding movement thereof in a predetermined horizontal direction;

slide plate means having an aperture therethrough which has an object receiving portion for receiving at least one said object to be dispensed, said slide plate means being supported upon said second support panel for horizontal movement thereover in said predetermined horizontal direction between a first position in which said slide plate aperture is generally aligned with said first support panel aperture for receiving said object therefrom and a second position in which said slide plate aperture is generally aligned with said second support panel aperture, said slide plate being operatively connected to said actuating means for movement with said actuating means; and

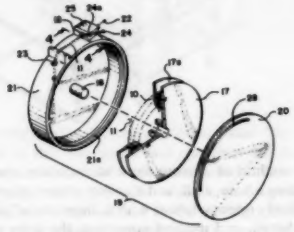
blocking apparatus supported by said housing means and including means for sensing the presence or absence of said object to be dispensed in said slide plate aperture and permitting said movement of said slide plate from said first position to said second position if said object is present in said slide plate aperture but blocking said movement of said slide plate from said first position to said second position if said object is absent, whereby the slide plate, the hopper and the actuating means may be moved from their respective first positions to their second positions only if an object to be dispensed is present in the slide plate aperture when the slide plate is positioned at the first position.

4,706,843

DISPENSING CHAIN OF LOOP LENGTHS OF DENTAL FLOSS OR THE LIKE AND METHOD OF FORMING SAME

Theodore W. Thornton, 745 Pacific Ave., Salt Lake City, Utah 84104

Filed Nov. 7, 1986, Ser. No. 928,182
Int. Cl.[4] B65H 1/00
U.S. Cl. 221—48 10 Claims



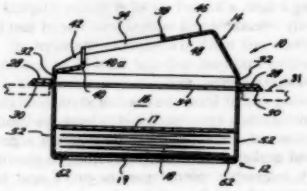
1. A dispensing chain of individual loop lengths of a narrow, easily tied, flexible material such as dental floss to be dispensed successively, comprising an elongate series of successively interconnected loop links, each being an elongate closed loop of said material having a knot formed at one end and being unknotted at the opposite end, said knot embracing the unknotted loop end next adjacent thereto in a slip fit, whereby the loop link whose unknotted loop end is thus embraced can be disengaged from the chain by merely exerting pulling force thereon while holding the embracing knot.

4,706,844

NAPKIN DISPENSER

Paul A. Omdoll, Palmyra, and Scott J. Collins, Milwaukee, both of Wis., assignors to San Jamar, Inc., Elkhorn, Wis.

Filed Jul. 24, 1985, Ser. No. 758,430
Int. Cl.[4] B65H 1/12
U.S. Cl. 221—59 19 Claims



1. A dispenser for paper napkins, comprising the following:

(a) a container for the paper napkins having an open top and containing spring biased means which urges the napkins in said container toward said open top;

(b) a distribution cover for said container which comprises the following:

a peripherial portion;

a body portion extending outwardly from said peripheral portion, said body portion having an outer face and an opening formed therein,

said outer face disposed at an angle to said open top of said container,

said opening being located in a lower part of said outer face,

said outer face having an upper part extending above and higher than said opening and said lower part;

said body portion having interior surfaces for contacting the edges of napkins urged against said interior surfaces from said container, the interior surface of the rear side of said upper part being inclined upwardly and inwardly so as to be at an obtuse angle to the interior surface of the top of said upper part;

said lower part of said body portion having on its interior face below said opening a centrally disposed drag area for engaging napkins urged against same from said container, said drag area being depressed relative to outboard portions of the interior face of said lower part which are located outboard of said drag area;

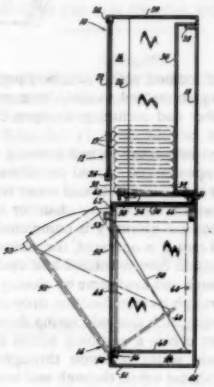
said drag area engaging the napkins inwardly along a surface extending from one of their edges, and providing a pressure surface between the napkins and said body portion for receipt of pressure from said spring biased means of said container and said drag area further retaining the napkins so that their rear edges are fanned out where they engage the interior surface of said rear side.

4,706,845

DIAPER DISPENSING AND DISPOSAL UNIT

David M. Schnurer, and Ellen R. Schnurer, both of 2600 S. Chicago Ave., South Milwaukee, Wis. 53172

Filed Jun. 23, 1986, Ser. No. 877,419
Int. Cl.[4] A47F *1/08*
U.S. Cl. 221—102 **10 Claims**



1. A diaper dispensing and disposal unit comprising:

(a) an upper dispensing section, said upper section having a rear wall, a pair of opposing side walls, and a front panel slidably movable to permit access to at least one of said vertical shafts, said upper section comprising:

at least one vertical divider, between said side walls and parallel thereto, defining a plurality of vertical shafts designed to hold a number of folded diapers in a vertical stack,

adjustable slot means at the front, bottom end of each shaft permitting withdrawal of a folded diaper thereby indexing downwardly the diapers contained in said shaft to move the diaper immediately above the withdrawn diaper down to said slot means and thereby into position for subsequent withdrawal, and

at least one removable spacer designed to allow adjustment of the cross-sectional spacing within a selected vertical shaft, and

wherein said adjustable slot means includes at least one removable shelf that can be selectively set at different vertical levels at the bottom of said shafts to accomodate diapers of different sizes; and

(b) a lower disposal section immediately below said upper section, said lower section having a top panel, a rear wall adjacent said rear wall of said upper section, a pair of opposing side walls and a bottom member, said lower section comprising:

a pivoting drawer including a door having a handle and acting as the front of said lower section, said drawer being pivotable between a first closed position and a second open position, wherein said door of said drawer in said first closed position forms a generally airtight compartment with said side walls, said rear wall of said lower section, said bottom member and said upper section, and

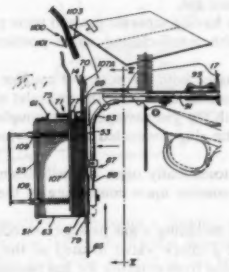
a receptacle within said drawer.

4,706,846

TAG DISPENSER

Bernard Engelhardt, 51 Abbeywood Trail, Don Mills, Ontario, Canada M3B 3B4

Filed Jul. 28, 1986, Ser. No. 889,744
Int. Cl.[4] B65H *1/08*
U.S. Cl. 221—232 **9 Claims**



1. A tag dispenser for use with a fastener and tag dispensing device, comprising:

a tag container for containing a plurality of tags, said tag container having a top wall and a dispensing wall, wherein the tags are stackable in said container in parallel with said dispensing wall;

a dispensing opening in said top wall through which tags are dispensed one tag at a time from said container;

slide means, slideable along said dispensing wall, and having a pusher portion for pushing a tag partially out of said container through said dispensing opening;

means for moving said slide means up and down along said dispensing wall, said tag being pushed partially out of said container on the upward stroke of said slide means; and

means for preventing retraction of said tag on the downward stroke of said slide means;

whereby, when a first tag is in a dispensing position along said dispensing wall, a second tag is engaged by said pusher portion and pushed up behind said first tag so that when said first tag is removed, said second tag will be in said dispensing position.

4,706,847

DISPENSER FOR WINE

Brian Sankey, Winchester, and Douglas Sankey, Chesterfield, both of Mo., assignors to Senmar Corporation, Ballwin, Mo.

Filed May 5, 1986, Ser. No. 859,429
Int. Cl.[4] B67D *1/08;* F16K *51/00*
U.S. Cl. 222—1 **4 Claims**

1. The combination of a wine dispensing mechanism coupled to a bottle of wine lying in on its side on a support with the neck of the bottle in a downwardly inclined position to dispense the contents by the combined effect of gravity and low pressure gas while protecting the remaining contents of the bottle against the deleterious effects of air, and utilizing a single source of low pressure inert gas for a number of bottles of wine, the mechanism attached to the inclined bottle so supported including:

a plug which is inserted in the neck of the wine bottle to replace the cork,

said plug being equipped with a gas inlet having an inner end and a wine outlet having an inner end, both inner ends being located inside the neck of the inclined bottle and restricted thereto, and having self-closing valves in the inlet and the outlet,

a coupler connected to a wine dispensing tap and a source of low pressure gas,

said couplier having separate gas and wine passages formed therein with a self-closing valve positioned in the gas passage,

means associated with the plug and coupler to permit them to be connected only with the gas inlet of the plug connected with the gas passage in the coupler and the wine outlet in the plug connected with the wine passage in the coupler,

means to automatically open the self-closing valves in the plug and coupler upon connecting of the plug and coupler,

the gas inlet including a gas passage extending through the plug with a check valve located in the gas passage to prevent wine from entering the gas passage, and in which the check valve communicates with an extension of the gas passage, which extension is presented by a tubular member which extends into the neck of the bottle beyond the inner end of the wine outlet thereby to limit gas percolating into the wine outlet.

4,706,848

HIGH EFFICIENCY BATTERY OPERATED WATER GUN

Bruce M. D'Andrade, 3 Ten Eyck Rd., Whitehouse Station, N.J. 08889

Filed Oct. 6, 1986, Ser. No. 915,418
Int. Cl.[4] A63H *3/18;* B65D *88/54*
U.S. Cl. 222—79 **16 Claims**

1. A toy water gun which comprises:

(a) a housing having the external appearance of a gun which includes a barrel and a handle;

(b) a water reservoir located within said housing;

(c) a battery operated pumping system located in said housing, which includes:

(i) a drive motor;

(ii) a gear system connected at one end to said drive motor and at the other end to a drive shaft;

(iii) a drive shaft being drivable from and movably connected to said gear system at one end and connected to a cam at its opposite end;

(iv) a cam connected to said drive shaft and being drivable thereby and being movably connected to a spring-loaded push rod said cam being a step-function drop off cam capable of loading said push rod and releasing said push rod in a step-function drop off fashion such that spring action will drive said push rod;

(v) a spring-loaded push rod movably connected to said cam at one end and loadable thereby and connected to a piston at its opposite end;

(vi) a main spring having adequate tension upon loading and release to drive said push rod;

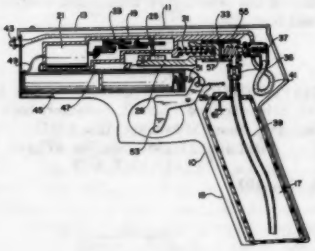
(vii) a piston movably connected to said push rod; and,

(viii) an intake valve and an exhaust valve connected to said piston, thereby creating a pump;

(d) a pickup tube connected to said intake valve at one end and connected to said water reservoir at the other end;

(e) a water tube connected at one end to the exhaust valve and at the other end to a spray nozzle;

(f) a spray nozzle attached to said water tube and located at the end of the barrel of said housing;



(g) a battery chamber located within said housing;

(h) electrical circuitry connected to said drive motor and to said battery chamber and including an open circuit/close circuit switch;

(i) a trigger movably connected to said housing and further connected to said open circuit/closed circuit switch;

such that when water is placed within said water reservoir, and batteries are placed within said battery chamber and the trigger is pulled, the electrical circuitry is completed within the battery, the aforesaid motor is operated, the motor drives said gears and driveshaft, said cam is rotated and cycled so as to move said push rod back and load same by closing said spring, and upon cycling through its step function drop off, releasing said push rod and spring such that said spring drives said push rod forward, so as to create a pumping action and so as to pump water from said water reservoir through said intake valve, through said exhaust valve, through said water tube and through said nozzle to create a series of spurts of water drawn from the reservoir and out the end of the nozzle in a repeating water gun fashion.

4,706,849

DEVICE FOR DISPENSING A PET FOOD FROM A SEALED CAN CONTAINER THEREFOR

Michael C. Ryan, P.O. Box 426, Mitchellville, Iowa 50169

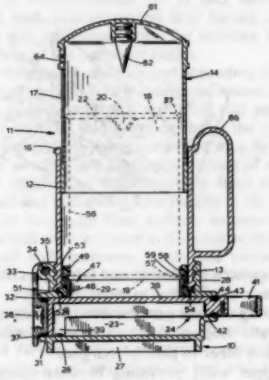
Filed Aug. 8, 1986, Ser. No. 894,629
Int. Cl.[4] B67B *7/24;* B65D *83/00*
U.S. Cl. 222—80 **4 Claims**

1. A device for dispensing a non-fluent food material from a cylindrical can container having a peripheral bead rim at one end thereof and wherein the can has an air hole in the opposite end thereof and is open at the one end over the cross sectional area defined by said peripheral bead rim, said device comprising:

(a) a cylindrical member and a removable piston cap mem-

ber for the cylindrical member having a cylindrical skirt portion in a telescopic relation with one end of the cylindrical member, and

(b) a can support means adjacent the other end of the cylindrical member for releasably engaging the peripheral bead rim of a can received in the cylindrical member in a supported position on the cylindrical member,



(c) said piston cap member, when in a telescopic relation with the cylindrical member, being movable toward said other end of the cylindrical member to compress and apply air under pressure through said air hole and against the material in the can to extrude the material from the open end of the can over the cross sectional area thereof.

4,706,850

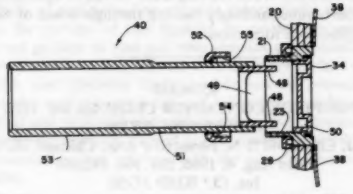
DRAIN FITMENT FOR BULK CONTAINERS

William J. Remaks, Anchorage, Ky., assignor to Weyerhaeuser Company, Tacoma, Wash.

Filed Jul. 17, 1986, Ser. No. 887,027

Int. Cl.[4] B65D *35/56*

U.S. Cl. 222—105 **13 Claims**



9. A fitment for a bulk container of the type having a side wall of multi-wall fibreboard with a side wall opening extending there through from an inner wall surface to an outer wall surface, and a plastic retainer member supportedly mounted within the container for retaining the bulk flowables, the plastic member having a drain opening extended there through in registry with the side wall opening for passing the flowables driven by gravity flow from the container from within the plastic member through the drain opening and side wall opening, the fitment comprising:

a drain spout assembly including an annular flange sealed to the plastic member about the drain opening, spout means in fluid communication with the drain opening for establishing a discharge flow path through the side wall opening, and restraining means operatively engaged to the multi-wall fibreboard within the side wall opening for restraining rotation of the spout means relative to the plastic retainer member, the spout means comprising a spout tube extended outwardly of the container, the spout tube including a threaded outer surface and a threaded inner surface, a nut threadably engaged to the outer surface of the spout tube in abutment with the outer wall surface of the side wall for holding the annular flange against the inner wall surface of the side wall;

a closure member removably mounted to the drain spout assembly for closing the flow path in a first position and opening the flow path in a second position;

a tubular member mounted in the discharge flow path and having a portion designed for reception in the closure member and including means, outside of the container, such that the tubular member may be gripped for translating movement of the portion into engagement with the closure member and into rotary movement of the closure member from the first position to the second position; and

coupling means for coupling the tubular member of the spout tube outer surface.

4,706,851

DISPENSER FOR BIRD FOOD

Leslie J. Hegedus, London, and Simon W. Bentall, St. Albans, both of England, assignors to Mehmet Nazim Adil, Girne Mersin, Turkey

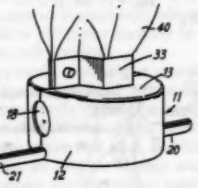
PCT No. PCT/GB84/00437, § 371 Date Aug. 13, 1985, § 102(e) Date Aug. 13, 1985, PCT Pub. No. WO85/02753, PCT Pub. Date Jul. 4, 1985

PCT Filed Dec. 18, 1984, Ser. No. 767,200

Claims priority, application United Kingdom, Dec. 20, 1983, 8333909

Int. Cl.[4] B65D *33/36*

U.S. Cl. 222—106 **6 Claims**



1. An arrangement for dispensing a flowing medium comprising a container for the medium and a dispenser having an inlet and an outlet and being located at the bottom of said container, said inlet being in communication with the bottom of said container, wherein said dispenser comprises two members, said members defining between them said dispenser inlet and being secured to each other and to said container by attachment means, said attachment means comprising projections and co-operating means receiving the projections, and said container comprises one or more wall portions said projections passing through one or more of said wall portions of said container before they are received by said co-operating means.

4,706,852

INLET SLEEVE FOR HOT-MELT DISPENSERS

Willi Borst, Florstadt, and Reinhard Pfisterer, Kelkheim, both of Fed. Rep. of Germany, assignors to USM Corporation, Farmington, Conn.

Filed Jun. 6, 1986, Ser. No. 871,727

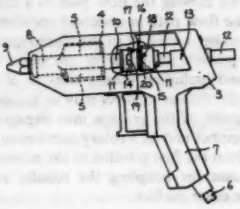
Claims priority, application United Kingdom, Jun. 12, 1985, 8514851

Int. Cl.[4] B67D *5/62*

U.S. Cl. 222—146.2 **1 Claim**

1. In a hot melt dispenser comprising a melt body in which a rod of thermoplastic material is melted, an inlet to said melt

body wherein said thermoplastic material is guided into said melt body, an outlet comprising an orifice for dispensing melted material, and means for heating the melt body so that said thermoplastic material fed as a rod into the melt body may be melted and then dispensed in a melted condition from said orifice, the improvement which comprises:



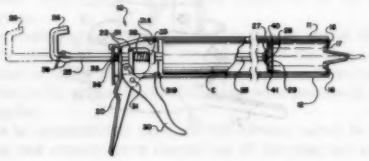
a sleeve of a heat-resistant silicon rubber material located at the inlet to the melt body, said sleeve comprising two elements separated by an air gap thermal barrier and a resilient silicon rubber tube located within said sleeve.

4,706,853

CAULKING GUN WITH MEANS TO PREVENT ROTATION OF COMPOUND CARTRIDGE DURING USE AND TO PROVIDE POSITIVE PRESSURE RELEASE

Gerald M. Stonesifer, 217 W. Eighth St., Charlotte, N.C. 28202, and Charles E. Harkey, 8715 Reedy Creek Rd., Charlotte, N.C. 28215

Filed Jan. 13, 1986, Ser. No. 817,982
Int. Cl.[4] B67D *5/42*
U.S. Cl. 222—391 **5 Claims**



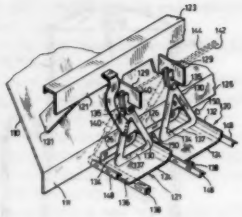
1. In a caulking gun of the type adapted to receive a tube-like cartridge of compound, wherein the cartridge has a piston in one end which expels compound from a dispensing nozzle as the piston is moved forward in the cartridge towards the dispensing nozzle, the gun having a cartridge holder, a handle attached to the cartridge holder, and trigger means cooperating with the handle to progressively urge a stem fixed against rotational movement relative to said cartridge holder and a disk fixed on the stem against rotational movement relative to the stem against the piston of the cartridge to expel compound from the discharge nozzle, the improvement which comprises at least one outwardly projecting prong eccentrically positioned on the disk in contact relation with the piston of the cartridge for wedging into the contact surface of the piston in non-undercutting relation to the piston without puncturing through the piston into the cartridge whereby compound is prevented from leaking therefrom, said prong engaging said piston to prevent clockwise or counterclockwise rotation of the cartridge as compound is expelled in order to maintain the angle of articulation of an angularly-cut dispensing nozzle and to exert a positive pull on the piston to urge it slightly rearwardly away from the dispensing nozzle as the stem is retracted from contact with the piston and before disengaging completely from the piston in order to release pressure on the piston and stop the flow of compound from the dispensing nozzle.

4,706,854

PARTICULATE MATERIAL HANDLING

Charles D. Pole, Willowdale, Canada, assignor to ULS International Inc., Toronto, Canada

Filed Feb. 5, 1986, Ser. No. 826,200
Claims priority, application Canada, Mar. 29, 1985, 477953
Int. Cl.[4] B65D *47/00*
U.S. Cl. 222—459 **11 Claims**



1. An apparatus for storing and feeding a charge of particulate material susceptible to arch formation, comprising a hopper having a lower part provided with elongated opposed hopper walls sloping downward and converging inward towards each other to parallel margins,

said hopper walls providing between them a narrowing storage space for holding a charge of particulate material and the parallel margins providing between them a long narrow discharge outlet gate means extending along the length of the outlet for maintaining it closed and opening it, in which:

there are dividing means within the hopper intersecting zones of natural transverse arch formation, said dividing means including at least a pair of spaced-apart parallel, elongated baffles extending longitudinally of the long narrow discharge outlet, the baffles being spaced from the hopper walls and above the parallel margins,

mounting means between the baffles at longitudinal intervals for pivotally mounting said gate means, said gate means including a series of swing gates mounted on said mounting means for closing and opening the outlet,

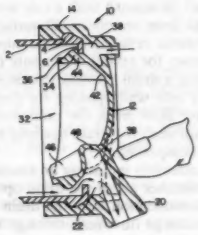
the gate means, when moving from closed to open position, having parts simultaneously passing through zones of natural longitudinal arch formation.

4,706,855

ONE-PIECE CONTAINER CLOSURE OF THE DISPENSING TYPE

Walter J. Litwin, 4471 N. Forestview Ave., Chicago, Ill. 60656

Filed Aug. 4, 1986, Ser. No. 892,958
Int. Cl.[4] B22D *37/00*
U.S. Cl. 222—511 **20 Claims**



1. A one-piece dispensing closure for a container having an open substantially cylindrical outlet, which outlet has an outer

surface, an inner surface and an open end, said closure comprising in combination:

a cap like member including a resilient and deformable substantially circular end wall having a depending peripheral skirt, said end wall having an outer surface and an inner surface, said end wall including a scoreline having a reduced wall thickness carried on its said outer surface which scoreline defines a segment intersecting less than about 170° of circumferential arc of said substantially circular end wall, said peripheral skirt having an inner surface of a size and construction for securing it to the exterior surface of the container outlet;

a resilient and deformable complex seal depending from said inner surface of said end wall in substantial spaced concentric relation to said peripheral skirt, said seal positioned and sized for insertion into the open end of the container outlet, said seal further being comprised of a first and a second body portion, said first body portion of said seal immediately adjacent to and depending from the inner surface of said end wall being substantially in the form of a hollow cone having an inner surface, an outer surface and a base, which cone increases in diameter as its distance from said end wall increases, while said second body portion of said seal begins at and is integral with said base of said cone and is substantially in the form of a hollow cylinder having a base and having substantially the same diameter as the diameter of said base of said cone, said complex seal further having a tapered external lip for normally forming a partially releasable seal with the internal surface of the container outlet, said tapered lip being located substantially circumferentially around and carried by said hollow cylindrical second body portion of said seal;

a dispensing opening through said end wall substantially within said segment defined by said scoreline and intermediate said peripheral skirt and said outer surface of said cone; whereby when inward pressure is exerted on said end wall in the vicinity of said scoreline a substantial portion of said end wall within said scoreline is moved inwardly, the portion of said seal which is in substantial registration with said scoreline is moved inwardly with said end wall and a substantial portion of said tapered lip carried by said inwardly moved portion of said seal is also moved inwardly and thereby released from sealing relation with the inner surface of the outlet with which it is normally sealed, while the portion of said seal which is outside of said scoreline remains substantially unmoved and the portion of said tapered lip carried by said unmoved portion of said seal also remains substantially unmoved and in sealing relation with the inner surface of the outlet, and whereby further, when inward pressure on said end wall is terminated said inwardly moved portion of said end wall and said seal quickly move outward and return said inwardly moved portion of said tapered lip to its normal sealing relation with the inner surface of the outlet.

4,706,856

BACKPACK WITH REMOVABLE INSULATED CONTAINER

Jeffrey M. Jacober, South Kingston, R.I., assignor to Sport Graphics, Inc., Cranston, R.I.

Continuation of Ser. No. 669,862, Nov. 9, 1984, abandoned. This application Mar. 6, 1986, Ser. No. 837,862

Int. Cl.[4] A45C *15/00*

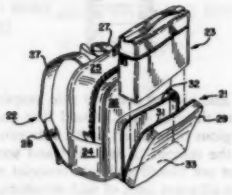
U.S. Cl. 224—151 **13 Claims**

1. A combination backpack and removable insulated container, comprising:

a separate and complete backpack component and a separate and complete insulated container component;

said insulated container component including a plurality of panels that are joined together at their respective edges into a compartment having a body and a rectangular mouth opening, said mouth opening being defined by an upstanding rectangular peripheral lip of a defined height, each of said panels having thermal insulation means, said insulated container component further including a rectangular cover member and a closure assembly for selectively opening and closing said open mouth, said cover member having an outside end that closely overlies and closes said mouth when said cover member is thus selectively closed;

said rectangular cover member of the insulated container component has a sidewall extending the full rectangular periphery of the cover member, said sidewall being defined betwen an outside end of the cover member and a closure assembly that selectively joins less than said full rectangular periphery of the sidewall of the cover member to the body of the insulated container component, the remainder of said full periphey of the sidewall of the cover member being hingedly attached to said body of the insulated container, said sidewall of the insulated container cover member having a height approximating said defined height of said peripheral lip, said peripheral upstanding lip extending beyond said cover member closure assembly, and said sidewall of the cover member generally overlies said peripheral upstanding lip when said cover member is



in a closed orientation, whereby said cover member, once open, will be engaged to interact with said closure assembly in order to allow the cover member to remain open and clear of the mouth opening;

said backpack component including a plurality of fabric panels that are joined together to form a soft-walled and uninsulated backpack body defining a backpack interior compartment that is sized and shaped to be suitable for storing and carrying goods and gear, said backpack body having a backstrap, an interior surface and an exterior surface, closure means for selectively gaining access to said interior compartment of the backpack body; and

a sleeve component secured to at least one of said fabric panels of the backpack component, said sleeve component having a mouth, said sleeve component and its mouth are sized and structured to closely receive, to hold and support said insulated container component, and to permit quick and easy removal of the insulated container as a unit from said sleeve, and said sleeve component is sized and is located on said backpack component for avoiding substantial reduction of said size of the backpack interior compartment.

4,706,857

WATCH BRACELET THE ELEMENTS OF WHICH ARE MAINTAINED ASSEMBLED BY MEANS OF TWO FLEXIBLE TIES

Pierre-André Aellen, Le Landeron, and Gaston Gagnebin, Bienne, both of Switzerland, assignors to Omega SA, Bienne, Switzerland

Filed Jun. 7, 1985, Ser. No. 742,486

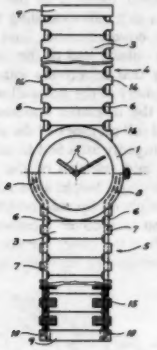
Claims priority, application France, Jun. 22, 1984, 84 10016

Int. Cl.[4] A44C *5/00*

U.S. Cl. 224—164 **9 Claims**

1. A watch bracelet comprising a first element including a casing for receiving a timepiece movement; first and second bracelet parts each comprising a plurality of second elements forming the links of the bracelet; first and second terminal elements; and first and second non-extensible flexible ties; said

first and second elements having first and second channels extending therethrough from a first side to a second side; said first and second ties extending through all said first and second channels to interconnect said first and second elements with said first element being located between second elements in each of said first and second bracelet parts; said first and second sides of said elements having a shape at least partially



interfitting with said second and first side, respectively, of the elements adjacent thereto; each of said first and second elements having regions of reduced width between said first and second sides in the regions of said first and second channels whereby said ties are visible and said bracelet may be flexed between any two adjacent ones of said elements; said terminal elements each including means for receiving and fastening one end of each of said ties.

4,706,858

HUNTING DEVICE

William G. Whatley, Rte. 1, Akron, Ala. 35441

Filed Sep. 18, 1986, Ser. No. 908,772

Int. Cl.[4] A45F *3/14*

U.S. Cl. 224—184 **9 Claims**

1. A hunting device for use as an article of clothing for the upper body and having utility for use by a hunter in towing game from the woods, comprising:

a sheet of flexible material in planar form with two opposing surfaces and having the general shape of a rectangle with two opposing short sides and two opposing long sides, said sheet material having an opening in the center portion thereof for insertion of the head and neck of the hunter;

a length of rope or other cord-like material, said rope being secured along one surface adjacent one short side of said sheet material including both ends of said one short side and extending from both said ends along each long side of said rectangular sheet material on the same surface of said sheet material, said rope having no fixed attachment to said sheet material along said long sides of said sheet material, said rope passing through said sheet material from one surface to the other of said sheet material adjacent each end of the other short side of said sheet material so that one end of said rope extends outwardly from each end of said other short side, said rope and sheet material thus allowing the arms of the hunter to be easily passed between the rope and the sheet material adjacent each long side of said sheet material and allowing said opposing short sides of said sheet material to be drawn together at approximately the waist level of the hunter to provide a jacket or vest-type article of clothing in which the rope extends outwardly from the waist level of the hunter.

4,706,859

CLOTHESPIN HOLDER

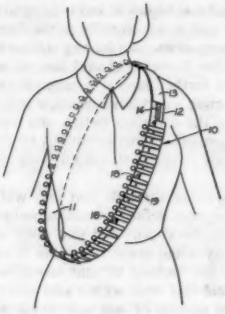
John R. W. Bebbington, and Julie C. Bebbington, both of 6 Parkway, Whitwell, Worksop, Nottinghamshire S80 4TR, United Kingdom

Filed Dec. 30, 1985, Ser. No. 814,734

Claims priority, application United Kingdom, Jan. 31, 1985, 8502504

Int. Cl.[4] A45F *3/00*

U.S. Cl. 224—224 **10 Claims**



1. A holder for clothespins comprising a first, flat, elongated member having a length adopted to form a loop to be placed on one shoulder of the user and wrap around and rest against the opposite side of the body, terminal end portions of said first member, attachment means on said terminal end portions whereby they may be releasably connected in overlapping relation in different positions selected by the user, a second, flat, elongated member coextensive with said first member and extending at least most of the distance between said terminal end portions of the latter, said second member being dimensioned for the mounting therealong of a row on clothespins in side-by-side relation and means for maintaining the second member in a relation generally parallel to but spaced from the first member such that in use of the holder the second member is held away from the clothing of the user to facilitate access to clothespins mounted along the second member.

4,706,860

BALL QUIVER

Michael J. Leider, 4761 Cathy Ave., Cypress, Calif. 90630

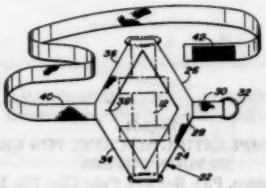
Filed May 19, 1986, Ser. No. 864,330

Int. Cl.[4] A45F *5/00*

U.S. Cl. 224—247 **2 Claims**

1. In a tennis ball quiver comprising, in combination, a spine, at least one ring and retainers so constructed and configured as to form a cage for holding at least two tennis balls, the cage being sufficiently resilient to permit a tennis ball to be removed from and inserted into the cage by resilient displacement of a retainer or ring, and means for securing the cage to the user, the improvement wherein the securing means comprises first and second belt halves and a diamond-shaped harness attaching the belt to the spine of the cage, the diamond shaped har-

ness comprising four straps, a first end of a first pair of said straps being attached adjacent a first end of the spine and a first end of a second pair of said straps being attached adjacent a second end of the spine, the first pair of straps extending downwardly and outwardly from the spine and the second pair of straps extending upwardly and outwardly from the spine, when the quiver is in use, the second end of one of the first pair



and one of the second pair of straps being attached to one end of the first belt half, the second end of the other of the first pair and the other of the second pair of straps being attached to one end of the second belt half, the two pairs of straps defining, when the quiver is in use, a diamond having one point above and one point below the belt, and one point on one side and one point on the other side of the spine, for thereby holding the spine of the quiver snugly against the side of the user.

4,706,861

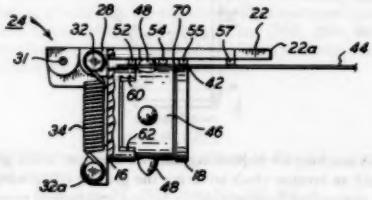
PERFORATED WEB FEEDING APPARATUS

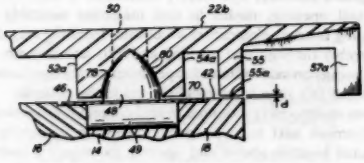
Leo J. Kerivan, Somerset, Mass., assignor to Precision Handling Devices, Inc., Fall River, Mass.

Filed Sep. 30, 1986, Ser. No. 913,830

Int. Cl.[4] G03B *1/30*

U.S. Cl. 226—74 **18 Claims**





1. Apparatus for feeding a perforated web which comprises a web drive member having pins which enter and engage the web in its perforations, a frame in which said web drive member is moveably mounted, said frame having inside and outside portions, said inside portion having a surface along side said drive member upon which said web is disposed when said web is engaged with said drive member, a lid pivotally mounted on said outside portion about an axis and being rotatable between open position and closed position respectively, away from and overlying said drive member and said frame, said lid presenting a surface overlying said drive member which is adapted to be separated therefrom by a gap when said lid is in closed position, said lid having a gap distance setting member projecting a predetermined distance from said lid surface in the direction of said frame to engage said web when said lid is in closed position to set said distance in accordance with the thickness of said web, the surface of said lid overlying said frame being spaced from said frame when said lid is in closed position, said gap setting member being opposed to at least a portion of said surface of said inside portion of said frame, and means biasing said lid towards said drive member when said lid is in closed position to bring said gap setting member against said web and said portion of said surface of said inside portion of said frame.

4,706,862

WEB THREADING APPARATUS, PARTICULARLY FOR THREADING OF A ROTARY PRINTING MACHINE, OR SIMILAR PAPER HANDLING SYSTEM

Klaus Theilacker, Friedberg, Fed. Rep. of Germany, assignor to M.A.N.Roland Druckmaschinen AG, Offenbach am Main, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 588,660, Mar. 12, 1984, abandoned. This application Sep. 9, 1985, Ser. No. 774,042

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1983, 3309121

Int. Cl.[4] B65H *20/16;* **B41F** *13/02;* **H01F** *1/22*

U.S. Cl. 226—92 **7 Claims**

1. For and in combination with a rotary printing machine having,

a pulling means (**1**, **2**; **29**, **32**) for pulling a web (**3**) through the machine, and applying, in operation, a pulling force on the web,

a paper web threading apparatus having,

a pulling connection (**7**; **21**, **22**, **34**) for attachment to the pulling means,

a tubular guide track (**30**) having a longitudinally extending slit (**31**), the pulling means (**29**) being located within the tubular guide track,

the slit (**31**) and a longitudinal axis of the tubular guide track defining a pulling plane;

and comprising

a plurality of projecting connecting elements (**32**) coupled to the pulling means (**29**) and extending through said slit (**31**), the respective ones of said projecting elements being longitudinally staggered along said pulling means,

the projecting connecting elements including connection ends (**33**) formed as slit rings;

a pulling and holding connection element (**21**; **22–25**) for coupling with the connection ends (**33**) of the projecting connecting elements (**32**),

the pulling and holding element comprising a head portion (**22**) of flat, planar sheet material characterized by being

essentially resistant to twist out of its major plane, an intermediate connection element (23) of flat planar sheet material characterized by being resistant to twist out of its major plane and resilient in the direction of pulling force being applied by the pulling means, and two magnetically responsive, magnetically jointly adhering flexible plate elements (28, 28'), shaped for positioning of the leading end portion of the web to be threaded between said plate elements, said plate elements retaining said leading end portion therebetween by frictional clamping force exerted by the magnetic adhesion of the flexible plate elements,

and wherein the head portion includes a threading connecting edge defining a bead (25) for threading the planar head portion through the slit of the slit rings of the connection ends (33) of the projecting connecting elements, and the bead (25) fitting within said slit rings;

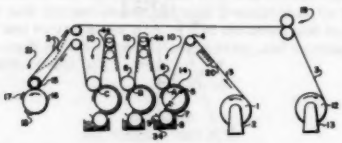
and stop means (34) formed on said head portion and dimensioned to accept said pulling force transferred from the pulling means via the projecting connecting elements to the head portion.

4,706,863

INTERMITTENT FEEDING APPARATUS FOR A CONTINUOUS SHEET

Tadashi Hirakawa; Tadashi Yano, both of Mihara, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 17, 1985, Ser. No. 745,425
Int. Cl.[4] B65H *20/12, 20/16*
U.S. Cl. 226—95 **4 Claims**



1. An intermittent feeding apparatus for intermittently feeding a continuous sheet past a working or processing section in a machine for working or processing the continuous sheet, said apparatus comprising:

a rotatable suction roll downstream in the direction in which the sheet is fed from the processing section and over which the continuous sheet is fed, and drive means for rotating said suction roll during the intermittent feed of the sheet, said suction roll having a first suction means for intermittently exerting suction on the continuous sheet for alternately forcing the continuous sheet against said roll when the suction is exerted while said suction roll is rotated by said drive means to feed the sheet with the rotation of said suction roll and interrupting the exertion of suction on the sheet for a predetermined period of time while said suction roll is rotated;

a suction box upstream of said suction roll and over which the continuous sheet is fed, said suction box having a second suction means for exerting suction on the continuous sheet while said first suction means of the suction roll intermittently exerts suction on the sheet, the suction exerted by said second suction means being less than the suction being exerted on the sheet by said first suction means for allowing the sheet to be fed by the suction roll when said roll is rotated and said roll exerts suction on the sheet, and for forcing the sheet against said suction box to stop the feed of the sheet during said predetermined period of time; and

a rotary pull roll adjacent said suction roll and between which said sheet is fed, said rotary pull roll having a first pulling member adjustably mounted along the outer periphery thereof for contacting said sheet to urge the sheet against said cylinder and coact therewith for feeding the sheet when suction is initially exerted by said first suction means, and a second pulling member adjustably mounted along the outer periphery of said pull roll for contacting the sheet to urge the sheet against said cylinder and coact therewith for feeding the sheet when the suction exerted by said first suction means is initially interrupted.

4,706,864

FASTENER IMPLANTING MACHINE FOR GROUND EROSION COVERS

William M. Jacobsen, P.O. Box 241, Palm City, Fla. 33490, and Andrew L. Parker, North Miami Beach, Fla., assignors to William M. Jacobsen, Palm City, Fla.

Filed Feb. 28, 1986, Ser. No. 834,426
Int. Cl.[4] B25C *1/02, 5/11;* **B27F** *7/26*
U.S. Cl. 227—109 **14 Claims**

1. A machine for implanting fastener elements in the ground to hold an erosion cloth covering the ground comprising:

an upstanding hollow column having an opening extending up from its lower end for passing fastener elements into the interior of the column:

a magazine assembly operatively connected to said column at said opening, means in said magazine assembly for feeding fastener elements in succession from the magazine assembly through said opening and into said column;

guide means on said column for permitting only one fastener element at a time to be received inside the column;

a driver reciprocably mounted in said column for downward movement next to said opening from an upwardly retracted position above said opening to engage a fastener element in the column and push said fastener element down through the erosion cloth and into the ground and for return movement up to said upwardly retracted position;

spring means biasing said driver to its upwardly retracted position;

and a foot pedal on the outside of said column reciprocable up and down along the column and operatively connected to said driver to displace the latter downward when the user forces the foot pedal down;

said opening in the column being on one side of the column;

said magazine assembly extending away from said column on said one side thereof;

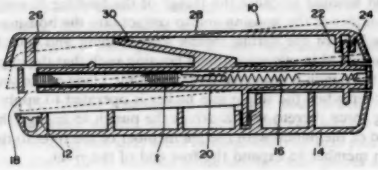
and said foot pedal being on the opposite side of said column.

4,706,865

STAPLER

Yoshiyuki Ebihara, Tokyo, Japan, assignor to Etona Company, Limited, Japan

Filed Aug. 14, 1986, Ser. No. 896,201
Claims priority, application Japan, Nov. 14, 1985, 60-255604
Int. Cl.[4] B25C *5/11*
U.S. Cl. 227—110 **1 Claim**



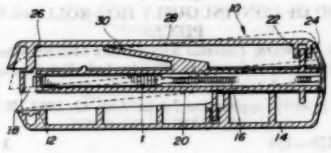
1. A throwaway stapler comprising: base means (**14**) formed with anvil means at its foward end, frame means (**20**) for containing a set of staples, means for forwardly biasing a set of staples to position the forwardmost one of said staples at a location coincident with a staple driving aperture (**18**) formed in the forward end of said frame means, longitudinally extending elongated manually engageable handle means (**28**) pivotally mounted on said frame means opposite said base means, said handle means being made of injection molded plastic, an actuating member (**26**) disposed at a forward end of said handle means and forming an integral plastic assembly therewith, said member merging laterally downwardly from said handle means, said atuating member being adapted to move through said staple driving aperture in said frame means and to drive the forwardmost staple from said frame means toward said anvil means on said base means when said handle means is pivoted toward said frame means, said plastic actuating member including a body (**26, 36, 46**) having a plate-shaped cross-section and thick-walled reinforcing means (**26A, 36A, 46A**) extending along the length of the body of said actuating member to incrase the durability of the stapler.

4,706,866

STAPLER

Yoshiyuki Ebihara, Tokyo, Japan, assignor to Etona Company, Limited, Japan

Filed Aug. 14, 1986, Ser. No. 896,189
Claims priority, application Japan, Nov. 21, 1985, 60-261981
Int. Cl.[4] B25C *5/11*
U.S. Cl. 227—120 **3 Claims**



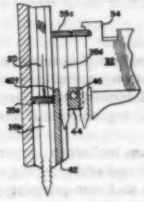
1. A stapler comprising a base section having an anvil at its forward end, a frame section containing a set of staples and forwardly biasing said set of staples toward through-opening means on the forward end of said frame section, a handle section pivotally mounted on said frame section on the side opposite to said base section, a forward end of said handle section including actuating means adapted to penetrate said through-opening means in said frame section and to drive the forwardmost one of said staples in said frame section toward the anvil on said base section, at least said handle section being injection-molded with said actuating means, said actuating means having a body portion (**26A**) and a thick-walled reinforcing portion (**26B**) extending along the length of the forward portion of said body portion, the improvement comprising staple restricting means for restricting the top of a staple against forward slippage when the staple is being driven by said actuating means, said staple restricting means including a lower end portion of said reinforcing portion which extends downwardly slightly beyond a lower end of said body portion of said actuating means to engage the forward face of the top of the staple.

4,706,867

NAIL GUIDE AND POSITIONING MEANS FOR A NAILING MACHINE

Edgar P. Anstett, Rte. 22, P.O. Box 300, Prairie View, Ill. 60069

Continuation-in-part of Ser. No. 802,840, Nov. 29, 1985, Pat. No. 4,657,166. This application Jan. 28, 1987, Ser. No. 7,769
Int. Cl.[4] B25C *5/06, 1/04*
U.S. Cl. 227—130 **10 Claims**



1. In a nailing machine having a reciprocatable blade for sequentially severing and driving nails from a nailing strip into a workpiece; a foot secured to the nailing machine below the reciprocatable blade; nail guide and positioning means attached to the foot, said nail guide and positioning means including a stationary plate member and a movable plate member, said movable plate member being movable between a normally extended nail receiving position and a nail contacting position; and nail feeder means for sequentially advancing nails in strip form into the nail guide and positioning means; the improvement wherein the movable plate member of the nail guide and positioning means is provided with rearwardly extending nail shank engaging means for maintaining the nail shanks of each nail of the nailing strip preceding the nail to be severed and driven into a workpiece in substantially parallel relation to the vertical axis of the driving blade, said nail shank engaging means further acting to resist any forces exerted by the nail feeder means on the nails of the nailing strip from changing the position of the nail shanks of said preceding nail with relation to the vertical axis of the driving blade.

4,706,868

PANEL FASTENER ASSEMBLY SYSTEM

Frederick A. Hammerle, Topsfield, Mass.; Philip M. Allen, Lathrup Village, Mich.; Richard Geddes, Boston, Mass., and Gary R. Malone, Rochester, N.H., assignors to TRW Inc., Cleveland, Ohio

Filed Feb. 24, 1986, Ser. No. 832,079
Int. Cl.[4] B25C *1/02;* **B23P** *19/00*
U.S. Cl. 227—149 **6 Claims**

1. A fastener insertion tool adapted for manual operation comprising:

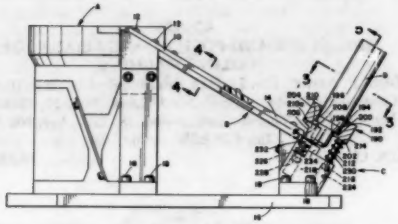
a housing adapted to be grasped by a tool operator, said housing having a bore formed therein,

an insert body slidably received in said bore such that one end of said body is interior of said bore and the other end is exterior of said bore, said body being movable between extended and retracted positions relative to said bore,

means for maintaining said insert body under a continual bias toward said extended position;

grasping means carried on the exterior end of said body and having jaw portions located outwardly of the exterior end of said body for selectively grasping fasteners, said jaw portions having gripping and non-gripping positions,

operating means for moving said jaw portions from said gripping to said non-gripping position as said insert body moves from said extended to said retracted position,



a press rod disposed in said bore and extending through said body for transmitting manually applied fastener insertion force from said housing to a fastener grasped by said grasping means, regardless of retraction of said insert body; and,

said operating means including cooperating surfaces carried by said press rod and said grasping means for moving said jaw portions to said non-gripping position as said body moves to said retracted position.

4,706,869

RIVETING ATTACHMENT

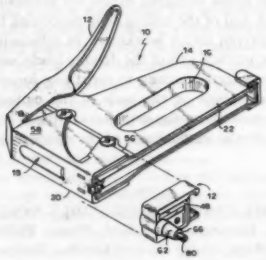
Barry Knispel, Hillsdale, and Rudolf Wingert, W. Milford, both of N.J., assignors to Arrow Fastener Company, Inc., Saddle Brook, N.J.

Continuation-in-part of Ser. No. 632,628, Jul. 19, 1984, Pat. No. 4,619,394. This application Jun. 9, 1986, Ser. No. 872,163

The portion of the term of this patent subsequent to Oct. 28, 2003, has been disclaimed.

Int. Cl.[4] B25B *31/00*; B25C *5/00*

U.S. Cl. 227—156 **18 Claims**



1. An attachment for connection to and use with a staple gun tacker having an outer housing including a working end and a staple driving blade mounted in said working end for reciprocating movement, said attachment being adapted for use in installing or setting a rivet of the type having a pin member mounted in a headed rivet shank having an expandable workpiece piercing free end, said attachment comprising a one piece attachment housing having a recess formed therein for receiving and being directly and removably mounted on said outer housing at said working end of said staple gun tacker and having a bore formed therein located to be in axial alignment with said staple driving blade when the attachment housing is mounted on said outer housing of the staple gun tacker, a hollow bushing mounted in said housing bore and having a flange formed thereon cooperating with a shoulder in said housing to limit outward movement of said bushing relative to the housing, a punch slidably mounted in said bushing for axial movement therein, said punch having a free driving end and an opposed impact end located within said attachment housing, said punch being axially free-floating within its range of operative movement; spring means biasing said bushing away from said housing to cause the flange of the bushing to engage the shoulder of the housing and to retract into the housing against the bias of the spring means; said bushing and punch being positioned in said attachment housing such that the impact end of the punch is impacted by said driving blade of the staple gun tacker when the staple gun tacker is operated to apply a driving force thereto which drives the punch to engage the drive end of the punch with the pin member of the rivet to drive the pin member to expand the free end of the rivet.

4,706,870

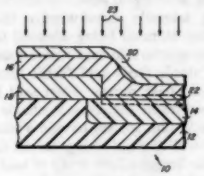
CONTROLLED CHEMICAL REDUCTION OF SURFACE FILM

Ronald N. Legge, Scottsdale, Ariz., assignor to Motorola Inc., Schaumburg, Ill.

Continuation of Ser. No. 682,863, Dec. 18, 1984, abandoned. This application Oct. 23, 1986, Ser. No. 921,838

Int. Cl.[4] B23K *31/02*

U.S. Cl. 228—123 **10 Claims**



1. A process for applying an electrical contact to the surface of a semiconductor device which comprises the steps of:

forming a layer of metal contacting said surface, said metal selected from metals having an easily reducible oxide;

implanting ions consisting solely of hydrogen ions into said layer of metal to reduce any oxides formed thereon without substantially heating said layer of metal; and

soldering a metallic contact to said layer of metal.

4,706,871

METHOD OF CONTINUOUSLY HOT-ROLLING STEEL PIECES

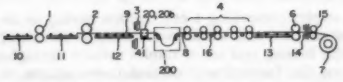
Toshiyuki Kajiwara; Tomoaki Kimura, and Mitsuo Nihei, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 10, 1984, Ser. No. 639,359

Claims priority, application Japan, Aug. 12, 1983, 58-146444

Int. Cl.[4] B23K *31/02*, *13/00*

U.S. Cl. 228—158 **3 Claims**



1. A continuous steel hot-rolling method in which flexible hot steel pieces of a thickness of between 30–60 mm, a predetermined length, and maintained at a high temperature, are successively bonded in series to form a continuous train of hot steel pieces for a continuous rolling by a rolling mill, the method comprising the steps of:

bringing the trailing end of a preceding hot steel piece and the leading end of a succeeding hot steel piece in close proximity to each other while said hot steel pieces are at a temperature of from 1,000° C. to 1,100° C. and travelling on the upstream side of said rolling mill;

shearing the trailing end portion of said preceding hot steel piece and the leading end portion of said succeeding hot steel piece while they are held in close proximity to each other;

immediately after shearing, heating the trailing end of said preceding hot steel piece and the leading end of said succeeding hot steel piece by a high frequency heating means to a desired temperature of 1,250° C. to 1,450° C. while said hot steel pieces are travelling;

pressing the heated leading end surface of said succeeding hot steel piece against the heated trailing end surface of said preceding hot steel piece to bond said hot steel pieces within about 20–35 seconds while said hot steel pieces are travelling to thereby form a continuous train of the hot steel pieces;

said heating and pressing being conducted at a heating temperature and a pressing force in a range determined in dependence upon the material of the hot steel pieces to be bonded;

storing a predetermined length of said preceding hot steel piece on an upstream side of said rolling mill to absorb a difference between a speed at which said preceding hot steel piece is introduced into said rolling mill and a speed at which said hot steel piece end surfaces are moved during bonding thereof; and

leading said continuous train of hot steel pieces into said rolling mill thereby continuously rolling said hot steel pieces.

4,706,872

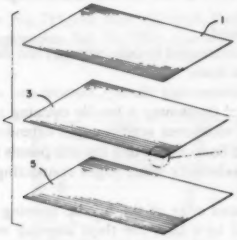
METHOD OF BONDING COLUMBIUM TO NICKEL AND NICKEL BASED ALLOYS USING LOW BONDING PRESSURES AND TEMPERATURES

Brian Norris, San Diego, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.

Filed Oct. 16, 1986, Ser. No. 919,703

Int. Cl.[4] B23K *1/04, 35/32*

U.S. Cl. 228—194 **6 Claims**



1. A method of bonding columbium to nickel and nickel based allowys, comprising the steps of:

(a) providing a first thin sheet of columbium,

(b) providing a second member having a composition taken from the class consisting of nickel and nickel based alloys,

(c) providing a brazing foil taken from the class consisting of titanium and copper coated titanium,

(d) placing said first sheet and second member in intimate contact with opposite sides of said brazing foil,

(e) heating the arrangement of (d) to a temperature above that of any eutectic which will form and below 2000° F., and

(f) cooling the arrangement of (e) to ambient temperature.

4,706,873

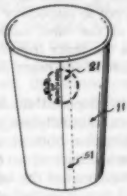
DISPOSABLE CUP WITH SIDEWALL POP-OUT

Werner Schulz, Newtown, Conn., assignor to James River-Norwalk, Inc., Norwalk, Conn.

Filed Jun. 25, 1982, Ser. No. 392,176

Int. Cl.[4] B65D *3/28*

U.S. Cl. 229—1.5 B **3 Claims**



1. A disposable paperboard cup for dispensing liquids, said cup having a tapered sidewall with a lapped side seam and a rolled rim wherein said side seam includes a bonded area within the boundaries of the overlapping parts of said sidewall and wherein protions of the surface of said sidewall are hidden from view by the curled rim and by said overlapping portions of the sidewall, which comprises:

a first line of weakness in said sidewall defining a first removable portion bounded along one side by an overlapping portion of said sidewall and covering a hidden message or indicia; and

a second line of weakness defining a second removable portion bounded on one side by the overlapped portion of said sidewall and bonded thereto to form a seam such that said first and second removable portions cooperate to define a removable medallion including a part of said seam;

said lines of weakness comprising a series of slits or perforations extending through said sidewall; and

a liquid impermeable protective coating on said sidewall rendering said sidewall and said lines of weakness liquid tight and preventing leakage therethrough until said line of weakness is broken.

4,706,874

PACKAGE FOR FLOWABLE FILLING MATERIALS HAVING A RE-CLOSABLE OPENING

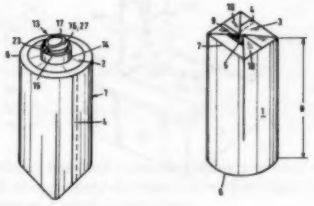
Wilhelm Reil, Bensheim, Fed. Rep. of Germany, assignor to Tetra Pak Developpement S.A., Pully, Switzerland

Continuation of Ser. No. 784,158, Oct. 4, 1985, abandoned, which is a division of Ser. No. 481,634, Apr. 4, 1983, Pat. No. 4,564,139. This application Feb. 11, 1987, Ser. No. 13,147

Claims priority, application Fed. Rep. of Germany, May 7, 1982, 3217156

Int. Cl.[4] B65D *3/10*

U.S. Cl. 222—526 **14 Claims**



1. A package for flowable filling materials comprising:

a plurality of at least four contiguous side walls joined together by at least one longitudinal sealing seam to form a tube having open bottom and top ends such that the tube

has a quadrangular configuration at least at its bottom end and at a section immediately adjacent thereto and a cylindrical configuration at least at its top end and at a section immediately adjacent thereto;

a multi-layer bottom wall joined to the side walls of the tube at its bottom end, the bottom wall having:

a pair of oppositely disposed single-thickness rectangular bottom walls panels, folded inwardly from inner transverse edges adjacent to respective sides of the quadrangular bottom end of the tube, such that outer transverse edges opposite to the inner transverse edges are directed toward a centerline of the plane passing through the bottom of the tube;

a pair of oppositely disposed double-thickness triangular bottom wall panels, mutually perpendicularly oriented to the pair of rectangular bottom wall panels, folded inwardly from bases adjacent to respective sides of the quadrangular bottom end of the tube on top of the rectangular-bottom wall panels such that apexes of the triangular bottom wall panels are directed toward a point at the center of the tube; and

a double-thickness transverse sealing flap having:

a section extending across the bottom wall, adjacently oriented parallel to the intersection of the inner transverse edges of the rectangular bottom wall panels, which section is folded laterally into the plane passing through the bottom of the tube; and

a section extending from the base to the apex of each triangular bottom wall panel, which sections are folded-over on top of the section extending across the bottom wall when the triangular bottom wall panels are inwardly folded, thereby creating quadruple-thickness sections of the transverse sealing flap, with the sealing flap being disposed overall between the rectangular bottom wall panels and the triangular bottom wall panels; and

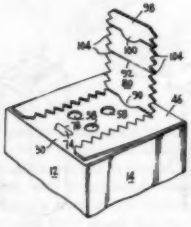
a top wall, injection molded from a thermoplastic material without a carrier material, and having a circular shape corresponding to the circular opening of the cylindrical open top end of the tube, the top wall being joined to the side walls of the tube at its open top end, and further having pouring means attached thereto capable of being moved from a first position wherein the pouring means is folded inwardly of the outside contour of the package for storage, to a second position wherein the pouring means extends outwardly from the outside contour of the package for pouring.

4,706,875

VENDING AND RECLOSURE DEVICE FOR POWDER AND GRANULAR PRODUCTS

Stephen M. Blackman, Westmont, Ill., assignor to Federal Paper Board Co., Inc., Montvale, N.J.

Filed Nov. 14, 1986, Ser. No. 930,400
Int. Cl.[4] B65D *5/08, 5/16, 5/72*
U.S. Cl. 206—626 **12 Claims**



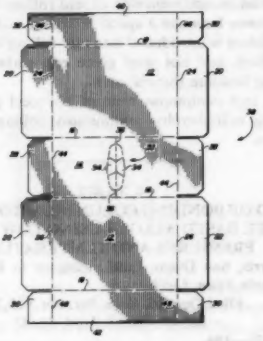
1. A resealable container comprising inner and outer panels disposed in overlapping relation, said inner panel defining a dispensing opening, said outer panel having formed therein a closure flap overlying said dispensing opening, said outer panel having spaced side edges, said closure flap being positioned between said outer panel side edges in spaced relation to said side edges, said closure flap having side edges and ends, said closure flap side edges being defined by zig-zag lines of weakening, one of said ends being defined by a fold line and the other of said ends being separable from said outer panel, whereby said closure flap may be partially separated from and hinged relative to said outer panel to uncover said dispensing opening upon completely rupturing said outer panel along said zig-zag lines of weakening, said zig-zag lines of weakening defining along each side edge of said closure flap a series of projections, and said inner panel having a cut line therein underlying and being generally aligned with each of said zig-zag lines of weakening, said cut lines defining on said inner panel shoulders behind which said closure flap projections are engageable in the resealing of said container.

4,706,876

SLEEVE-TYPE CARRIER HANDLE

Jerry F. Wilson, West Monroe, La., assignor to Manville Corporation, Denver, Colo.

Filed Sep. 18, 1986, Ser. No. 908,547
Int. Cl.[4] B65D *5/46*
U.S. Cl. 229—52 B **10 Claims**



1. A sleeve-type article carrier, comprising:

a top panel;

a bottom panel;

side panels connected to the top panel and the bottom panel along fold lines;

end panels connecting the top, bottom and side panels;

the top panel containing a handle opening comprising two relatively elongated spaced edges extending transversely of the fold lines connecting the side panels to the top panel and two relatively short edges connecting the elongated edges;

each elongated edge of the handle opening being foldably connected to a flap, the flaps meeting intermediate the elongated edges of the handle opening, each flap being comprised of a plurality of tabs, and each adjacent tab being separated from each other by a slit to facilitate the downward folding of the flaps;

the top panel containing slits extending from the short edges of the handle opening to the fold lines connecting the side panels to the top panel; and

the elongated edges of the handle opening being spaced apart at a point midway along their length a distance greater than their spacing adjacent the short edges of the handle opening;

whereby the fingers of a person lifting the carrier can press down against either flap to fold it downwardly about its fold line, and upon lifting the carrier the top panel will

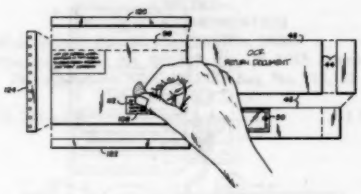
bow upwardly adjacent both elongated edges of the handle opening.

4,706,877

WINDOWED MAILER WITH RETURN ENVELOPE FOR REMITTANCE DOCUMENT, HAVING RETURN MAIL-TO ADDRESS EXPOSED BY REMOVAL OF ORIGINAL MAIL-TO LABEL

Richard A. Jenkins, Wheeling, Ill., assignor to Moore Business Forms, Inc., Glenview, Ill.

Filed Jan. 9, 1987, Ser. No. 1,764
Int. Cl.[4] B65D *27/06*
U.S. Cl. 229—73 **18 Claims**



1. A mailer, comprising:

two outer sheet means initially joined to one another about at least two opposite ones of four corresponding marginal edges of each, and an inner sheet means sandwiched between said two outer sheet means and initially joined to one of said two outer sheet means along three corresponding marginal edges to define a potential return envelope;

the other of said two outer sheet means including a fully cut-out window aperture;

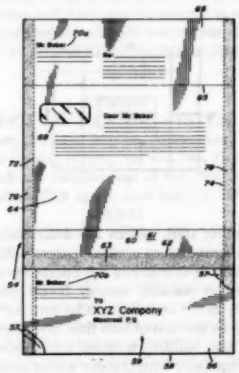
an initial mail-to address printed on an outer label and removably adhered by reusable adhesive means to a liner means in turn mounted to said inner sheet means with said initial mail-to address disposed in registration with said window aperture so as to be readable therethrough.

4,706,878

SELF-MAILER ENVELOPE

Mark S. Lubotta, and Martin Scullion, both of Westmount, Canada, assignors to FCA International Ltd., Montreal, Canada

Division of Ser. No. 716,083, Mar. 26, 1985, Pat. No. 4,668,211. This application Jul. 30, 1986, Ser. No. 890,740
Int. Cl.[4] B65D *27/06*
U.S. Cl. 229—73 **2 Claims**



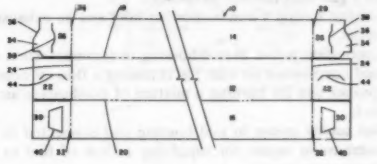
1. A blank sheet for forming a returnable mailer wherein the blank comprises a sheet of rectangular outline having end edges and side edges, a pair of marginal tear strips defined along the side edges and delimited by the length of the blank and parallel to the blank side edges; a first rectangular panel extending inwardly from one end edge and delimited by a first fold line, a second panel immediately adjacent the first panel and defined at one end along the first fold line, the second panel being delimited at the other end by a first widthwise line of serrations parallel to the first fold line, a third panel of rectangular outline adjacent the secnd panel and delimited by the first widthwise line of serrations at one end and a second fold line at the other end, the second panel including an adhesive area adjacent said first line of serrations, a fourth panel adjacent the third panel and delimited at one end by the second fold line and at the other end by a third fold line with the third fold line being parallel to the first and second fold lines, and a fifth panel delimited by the third fold line and the other end edge of the blank; an addressee area provided on the fifth panel, a window defined in the fourth panel and coincident with the addresses area in the fifth panel when the fifth panel is folded over the fourth panel at said third fold line, glue areas defined along the marginal tear strips in one of the first and second panels whereby the first and second panels can form a return envelope and the second panel defines an adhesive closure flap below the first line of serrations for the return envelope when the first panel is folded onto the second panel and these two panels are secured to each other at their side edges; the fifth panel being foldable over the fourth panel and the overfolded fifth and fourth panels being foldable, along the second fold line, over the prefolded first, second and the third panel panel when the marginal tear strips are adhesively fastened for providing a complete mailer with the addressee area exposed through the window of the fourth panel, said fourth panel having, between the second and third fold lines, a length greater than that of any of the other respective panels, said fifth panel being of a length less than one-half of said fourth panel, said first and third panels, when overfolded having a length greater than one-half the length of said fourth panel, whereby said return envelope and fifth panel will overlap within the length of said fourth panel; said window being located in an upper left-hand portion of said fourth panel whereby the entire remaining portion of the fourth panel is available for a message.

4,706,879

FOLDING CARTON WITH IMPROVED THREAD AND PUNCH LOCK

John W. Cargile, Jr., Decatur, Ga., assignor to Kliklok Corporation, Decatur, Ga.

Continuation of Ser. No. 824,064, Jan. 30, 1986, abandoned. This application Dec. 1, 1986, Ser. No. 936,495
Int. Cl.[4] B65D *5/26*
U.S. Cl. 229—194 **12 Claims**



1. A folding end lock carton including a bottom wall panel and a pair of oppositely disposed side wall panels articulated to said bottom wal panel, comprising:

an interior end panel articulate to said bottom wall panel for providing additional strength to said carton and further isolating the carton interior along the lock from outside elements;

first and second locking end panels including locking means,

and first and second locking end panels being articulated to said side wall panels and overlapping each other end overlying said interior end panel when locked; and

relief means formed on said interior end panel to insure full engagement of said locking means of said overlying first and second locking end panels, said relief means being separate from said locking means so that no portion of said locking means extends through said relief means into said carton interior when in the locked position.

4,706,880

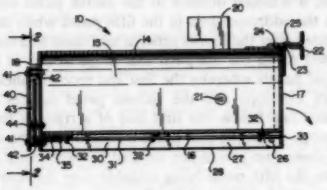
SIGNALING MAILBOX

Lloyd D. Peters, 2251 Presley Dr., Grove City, Ohio 43123

Filed May 8, 1986, Ser. No. 860,852

Int. Cl.[4] B65D *91/00*

U.S. Cl. 232—35 **4 Claims**



1. In a mailbox having a front end with an opening for the deposit and retrieval of mail from the street and a rear end facing away from the street, opposite sides between the front and rear ends, and including a top for protection from the elements and a bottom for support of and positioning of the mailbox, the improvement comprising:

means for providing a signal that is visible at a selected side from the front and/or rear of the mailbox indicating that the front door of the mailbox has been opened, said signal means including an element that moves from an unexposed hidden position within the planes of the sides of the mailbox to a visually exposed position beyond the planes of the sides of the mailbox, with the signal element rotatively supported within an enclosure on the rear end of the mailbox.

4,706,881

SELF-CORRECTING MICROPROCESSOR CONTROL SYSTEM AND METHOD FOR A FURNACE

Gary W. Ballard, Indianapolis, Ind., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Nov. 26, 1985, Ser. No. 802,272

Int. Cl.[4] F23N *1/00*

U.S. Cl. 236—15 BD **5 Claims**

1. In a gas-fired furnace including

a housing having a combustion air inlet and an exhaust gas outlet,

a combustion means in said housing in communication with said combustion air inlet for receiving a flow of combustion air and for burning a mixture of combustion air and fuel,

a fuel supply means in said housing and connected to said combustion means for supplying a flow of fuel to said combustion means,

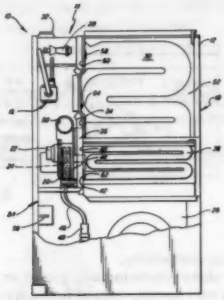
a heat exchanger means in said housing in communication with said combustion means and said exhaust gas outlet for delivering a flow of combusted fuel air mixture therethrough, and

a blower means in said housing in communication with said combustion means and said heat exchanger means for providing a flow of combustion air through said combustion air inlet and said combustion means and a flow of a combusted fuel air mixture through said heat exchanger means and said exhaust gas outlet,

a self-correcting microprocessor control system, comprising:

a pressure-differential measuring means for measuring a pressure differential across said heat exchanger means and for generating a pressure signal in response thereto indicative of the pressure differential value,

a microprocessor control means for receiving said pressure signal, for determining when said pressure signal falls below a predetermined value indicative of insufficient combustion air flow through said combustion means, and



for generating in response thereto a blower control signal to said blower means,

said blower means providing in response to said received blower control signal an increase in flow of combustion air through said combustion means wherein if said microprocessor control means determines subsequent ones of said pressure signal to be less than said predetermined value, said microprocessor means generated in response thereto a termination signal to said fuel supply means, and

said fuel supply means terminates in response to said received termination signal the flow of fuel to said combustion means.

4,706,882

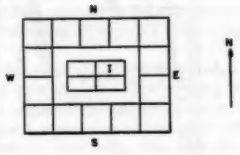
ADAPTIVE OPTIMUM START

William B. Barnard, Arlington Heights, Ill., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Feb. 15, 1985, Ser. No. 702,285

Int. Cl.[4] F23N *5/20*

U.S. Cl. 236—46 R **15 Claims**



1. An optimum start system for determining the optimum start time of a temperature control system within a building so that energy can be conserved by operating the temperature control system at reduced energy levels during periods of non-occupancy of the building and by starting the temperature control system an amount of lead time prior to the beginning of occupancy of said building wherein the amount of lead time is selected to bring space temperature within said building within a comfort range by the start of occupancy, siad optimum start system comprising:

space temperature sensing means for sensing space temperature within said building;

outdoor air temperature sensing means for sensing outdoor air temperature external to the building; and,

controller means connected to said space temperature sensing means, said outdoor air temperature sensing means, and said temperature control system for determining said lead time as a function of a correction factor derived by averaging the accuracy of the lead time of the current day and a correction factor for at least a prior day, said correction factor of said prior day being given a predetermined weight with regard to the accuracy of the current lead time, and as a function of the temperature sensed by one of said temperature sensing means.

4,706,883

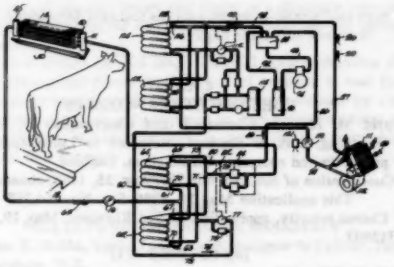
PUMP HEATING SYSTEM

Dale Fleischmann, Box 38, Wausau, Wis. 54401

Continuation of Ser. No. 489,477, Apr. 28, 1983, abandoned. This application Mar. 22, 1985, Ser. No. 715,752

Int. Cl.[4] G05D *23/00*

U.S. Cl. 237—2 B **11 Claims**



1. A system for utilizing heat generated by livestock in an agricultural operation to heat a residence, including a first heat exchanger located in the barn, a second heat exchanger located remote from said barn, in a heat pump unit at said residence, a plumbing circuit for circulating a water-based transfer medium between said first and second heat exchangers in a closed loop, a third heat exchanger in said heat pump unit, a refrigerant circuit communicating with said second and third heat exchangers and including refrigerant coils in said second and third heat exchangers, and a compressor associated with said refrigeration circuit and a second closed loop plumbing circuit for circulating water between said third heat exchanger and a fourth heat exchanger which heats the residence and wherein each of said second and third heat exhangers in said heat pump unit is divided with separate inputs and outputs for the divided units connected in parallel to the respective plumbing circuits.

4,706,884

HOT AIR HEATING SYSTEM

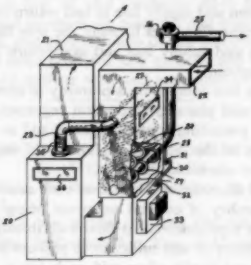
Robert C. Brauer, 2123 N. 89th St., Milwaukee, Wis. 53226

Continuation-in-part of Ser. No. 453,746, Dec. 27, 1982, abandoned, which is a continuation of Ser. No. 365,496, Apr. 4, 1982, abandoned. This application Sep. 11, 1984, Ser. No. 649,842

Int. Cl.[4] F24B *7/00*

U.S. Cl. 237—55 **6 Claims**

1. A hot air heating system, comprising a furnace to burn a fuel and heat air passing through the furnace, a supply duct connected to the furnace for supplying heated air to a zone to be heated, a return duct for returning cool air from said zone to the furnace, a flue gas conduit connected to the furnace for discharging hot flue gases, a heat exchanger disposed within the return duct and having an inlet connected to said flue gas conduit, said heat exchanger having an outlet, a discharge conduit connecting the outlet of the heat exchanger to the atmosphere, a blower located in the discharge conduit for drawing the flue gases through the heat exchanger and discharging the flue gases to the atmosphere, heat from the flue gases being transferred to the return air in said return duct to thereby pre-heat the return air and cool said flue gases, a sump located below the heat exchanger for collecting water condensed from the cooled flue gases, said heat exchanger having an outlet in the lower end thereof, said sump disposed in the



return duct beneath said outlet, and flow control means for permitting the flow of condensate through said outlet to said sump and for preventing the flue gases from passing through said outlet to said sump, said return air passing over the water in said sump to thereby humidify the return air, said flow control means comprising a generally U-shaped tubular member having a pair of vertically extending legs, one of said legs connected to said outlet and the other of said legs communicating with said sump.

4,706,885

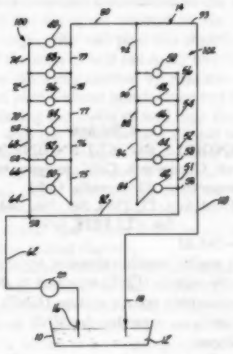
LIQUID DISTRIBUTION SYSTEM

Rolland L. Morin, 5550 Carleton Rockwood Rd., South Rockwood, Mich. 48179

Continuation of Ser. No. 638,125, Aug. 6, 1984, abandoned. This application Jul. 30, 1986, Ser. No. 892,737

Int. Cl.[4] B05B *15/00*

U.S. Cl. 239—76 **2 Claims**



1. A liquid distribution system comprising: a reservoir of liquid;

a piping system having an inlet and an outlet, said inlet and outlet being open to said reservoir, said piping system further having a supply line in flow communication with

said inlet and a return line in flow communication with said outlet;

means for pumping liquid under pressure from said inlet and towards said outlet;

a plurality of connecting lines at spaced intervals along said piping system and each connecting line having an inlet open to said supply line and an outlet open to said return line, each connecting line having a selectively operable liquid tap, each of said liquid taps selectively operable between an open position for diverting liquid from the piping system and a closed position for communicating liquid from said supply line to said return line, said plurality of connecting lines forming the sole fluid connection between said supply line and said return line outside of said reservoir;

said supply line comprising a plurality of conduit segments, each of said plurality of conduit segments extending between a preceding conduit segment and an inlet of one of said taps so that at least a plurality of said conduit segments are connected in series,

an internal diameter and length of each conduit segment of said plurality of conduit segments being determined to maintain a predetermined flow rate through each tap of said plurality of taps sufficient to prevent pigment separation of said liquid when said each tap is in said closed position, said internal diameter and length of each of said plurality of conduit segments being dimensioned substantially in accordance with the following formula:

$$\frac{L}{ID^4} = \frac{P}{.0273 \times V \times Vol}$$

(The ID being raised to the fourth power)

where

ID=said inner diameter of said each conduit segment in inches

L=length in feet of said each conduit segment

P=pressure drop in psi through said each conduit segment

V=viscosity of the liquid in poise, and

Vol=required flow rate through said each conduit segment in gallons/minute.

4,706,886

EXTENDIBLE ROCKET-ENGINE NOZZLE

Premysl Jencek, Chatsworth, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Aug. 27, 1984, Ser. No. 644,412

Int. Cl.[4] F02K *9/97*

U.S. Cl. 239—265.33 **27 Claims**

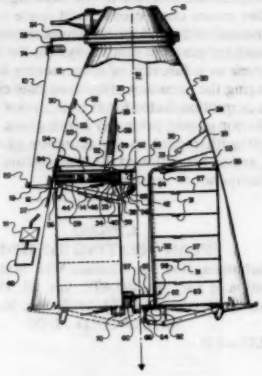
1. A rocket engine nozzle-extension apparatus comprising:

a fixed nozzle section (FNS) attached to the engine;

a unitary extendible nozzle section (ENS) which, in its retracted position, encircles the FNS in the manner of a spaced sleeve;

nozzle-extending means for extending the ENS to a fully extended position which proceeds from the rear end of the FNS, said nozzle-extending means comprising a main inflatable bag located within the FNS, said bag having a front and a rear surface; and

decoupling means for jettisoning said nozzle-extending means after the ENS is in its fully extended position, wherein



both said nozzle-extending means and said decoupling means comprise inflatable bags.

4,706,887

FUEL INJECTION NOZZLES

David M. Harvey, Glemsford, and Charistopher J. Moody, Worthing, both of England, assignors to Lucas Industries public limited company, Birmingham, England

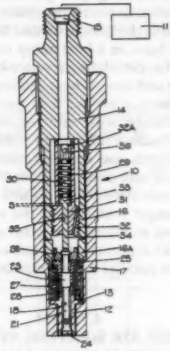
Continuation of Ser. No. 603,701, Apr. 25, 1984, abandoned.

This application May 14, 1986, Ser. No. 864,755

Claims priority, application United Kingdom, May 19, 1983, 8313903

Int. Cl.[4] B05B *1/32*

U.S. Cl. 239—453 **5 Claims**



1. A fuel injection nozzle for supplying fuel to a compression ignition engine, comprising,

a casing;

a valve body mounted on said casing and having a spring retainer seat which engages said casing, said valve body including an opening for injecting fuel into an associated chamber of the compression ignition engine and a seating;

a first spring abutment means located within said casing adjacent to said valve body;

a first spring located between said spring retainer seat and said first spring abutment;

a valve stem slidably located within said valve body and said first spring abutment member and including on one end

thereof a valve head engageable with said valve body seating and on another end thereof a retainer means engaging said valve body first spring abutment on a side of said spring abutment which is opposite to said first spring, said first spring being arranged to bias said valve head toward engagement with said valve body seating;

fuel passage means in said casing fluidly connecting said valve head to a fuel injection pump for conducting fuel to said head to move said head away from said seating against the bias of said first spring;

nozzle opening control means for controlling movement of said valve head away from said valve body seating, said control means including an insert member mounted on said casing, a spring chamber within said insert member, a second spring located within said spring chamber, a piston having a piston head located in said srping chamber in contact with said second spring and a body extending out of said spring chamber and having an end which is located in said fuel passage means, said piston end having a portion thereof in contact with said stem to transfer force from said second spring to said stem, said second spring being arranged to bias said valve head away from engagement with said valve body seating, said piston end having another portion which is exposed to fuel pressure in said fuel passage means and being located and positioned so that fuel pressure biases said piston in a direction opposite to the bias exerted on said piston by said second spring; and

isolation means on said insert member spring chamber for isolating said piston head from fuel pressure in said fuel passage means so that piston movement caused by said second spring is only opposed by fuel pressure acting on said piston end another portion and by the bias exerted by said first spring.

4,706,888

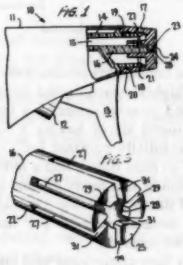
MULTI-PURPOSE NOZZLE ASSEMBLY

Douglas B. Dobbs, Yorba Linda, Calif., assignor to Calmar, Inc., Watchung, N.J.

Filed Jul. 11, 1986, Ser. No. 884,437

Int. Cl.[4] B05B *1/34*

U.S. Cl. 239—478 **3 Claims**



1. A multi-purpose nozzle assembly for a liquid dispenser, comprising, a tubular outlet member having a discharge passage through which liquid product is adapted to pass, a fixed, coaxial plug element located in said tubular member, a nozzle cap having a central discharge orifice and being mounted for relative rotation between at least one discharge closed position and two selective discharge open positions without axial displacement at the end of said tubular outlet member, said cap having an inner cylindrical sleeve in rotative engagement with said plug element, the peripheral surface of said plug element having longitudinal grooves, said plug element having an end wall with a central depression coaxial with said discharge orifice, alternating tangential and radial channels in said end wall extending between said depression and said longitudinal grooves, said channels presenting spaced surface segments at said end wall, said cap having a wall containing said discharge orifice and having a completely smooth and uninterrupted inner surface which confronts said end wall and defines a chamber with said depression, said inner surface bearing against said surface segments and avoiding any shearing action therewith during said relative rotation, and longitudinal passages in an inner peripheral surface of said sleeve, said grooves and said passages being relatively arranged such that upon rotation of said cap into said discharge closed position said grooves and said passages are mismatched, upon rotation of said cap into a first of said discharge open positions said grooves and said passages are matched and register with said radial channels, and upon rotation of said cap into a second of said discharge open positions said grooves and said passages are matched and register with said tangential channels.

4,706,889

SPRAY-SHOWER WITH NOZZLES, PARTICULARLY FLAT FAN NOZZLES

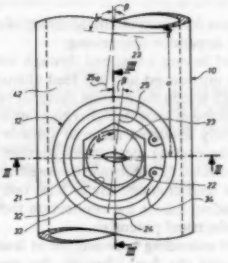
Hans J. Hofmann, Nashua, N.H., assignor to Spraco, Inc., Nashua, N.H.

Filed Jun. 8, 1982, Ser. No. 386,308

Claims priority, application Fed. Rep. of Germany, Feb. 12, 1982, 3204955

Int. Cl.[4] B05B *13/02*

U.S. Cl. 239—550 **11 Claims**



1. Spray-shower apparatus for insertion into an opening in the spray-shower pipe having a curved inside surface and a curved outside surface comprising,

nozzle base means for supporting a spray-shower nozzle means in predetermined relationship to the pipe axis with the plane of the fan spray emitted by the nozzle means forming an angle with said pipe axis slightly greater than zero so that the ends of said fan spray overlap the ends of any adjacent fan spray emitted by adjacent nozzle means seated in said pipe without interference and having a front surface for facing the inside of said pipe that is curved in conformity with the inside surface of said pipe,

said nozzle base means being formed with a recess for supporting itself at said pipe outside surface,

said nozzle base recess having a top edge and running edge of shape corresponding to respective lines of self-intersection of said nozzle base means with the outside surface of said pipe when seated thereon,

said nozzle base means including keying means for engagement with said nozzle means to maintain said nozzle means in said predetermined relationship when said nozzle means is seated in said nozzle base means and said nozzle base means is seated in an opening in said spray-shower pipe wall with said recess engaging said pipe outside surface,

said nozzle base means being a cast part,

said pipe being formed with said opening,

said nozzle base means being seated in said opening with said front surface conforming to said inside surface,

said nozzle means being seated in said nozzle base means with means defining a slit-like aperture extending into said pipe radially inward of the inside surface thereof with the long axis of said aperture forming an angle with the axis of said pipe that is slightly less than 90°.

4,706,890

METHOD AND APPARATUS FOR ELECTROSTATIC COATING OF ARTICLES WITH POWDERED COATING MATERIAL

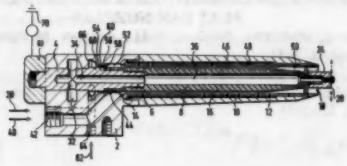
Radovan Talacko, St. Gall, Switzerland, assignor to Ransburg-Gema AG, Switzerland

Filed Apr. 15, 1986, Ser. No. 852,149

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1985, 3514523

Int. Cl.[4] **B05B** *5/00, 7/08, 1/26;* **H05F** *3/00*

U.S. Cl. 239—692 **8 Claims**



1. An apparatus for electrostatic spraying of coating material on articles, the apparatus comprising:

a feed channel having a first end through which the coating material is introduced into the feed channel and a second end through which the coating material emerges, the feed channel having at least one charging surface therein made of electrically insulated material suitable for electrically charging the coating material by friction;

at least one discharge electrode disposed at a location outside of the feed channel, the at least one discharge electrode including means for connection thereof to a predetermined electrical potential;

a gas channel extending between the at least one discharge electrode and the feed channel, the gas channel being suitable for enabling an electrically conductive gas to flow and contact both the at least one discharge electrode and the at least one charging surface in the feed channel, whereby the gas is effective for preventing coating material from reaching the at least one discharge electrode and also for providing an electrically conductive path through which electrical charges collected on the at least one charging surfaces are conducted to the at least one discharge electrode.

4,706,891

PROCESS FOR PRODUCING HIGH CONCENTRATION COAL-WATER SLURRY

Kazuhiko Nakaoji, Ichihara; Mitsugu Kamao, Chigasaki; Hayami Itoh, Himeji; Shuhei Tatsumi, and Shoichi Takao, both of Akashi, all of Japan, assignors to Lion Corporation; Kao Corporation; Mitsui Engineering and Shipbuilding Company Limited; Electric Power Development Company Limited, all of Tokyo and Kawasaki Jukogyo Kabushiki Kaisha, Hyogo, all of, Japan

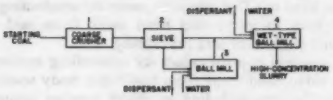
Continuation of Ser. No. 446,603, Dec. 3, 1982, abandoned. This application Aug. 7, 1986, Ser. No. 893,446

Claims priority, application Japan, Dec. 3, 1981, 56-194775

Int. Cl.[4] **B02C** *19/12*

U.S. Cl. 241—16 **6 Claims**

1. A process for producing a high-concentration coal-water slurry by pulverizing coal, which comprises first coarsely crushing a starting coal so that the substantial portion of the coal particles coarsely crushed will have a particle size of approximately 4 mm. or smaller, further pulverizing 95 to 30 percent by weight of the coarsely crushed coal thus obtained into a finely pulverized coal of a particle size such that major portion of the particles finely crushed will pass a 200-mesh screen, subjecting the finely pulverized coal thus obtained, together with the remainder of the coarsely crushed coal, to



crushing in a wet-type crusher, and pulverizing and adjusting the coal particles to a particle size constitution of 20 to 30 percent by weight of 200-mesh size and larger, up to 80 percent by weight of 350-mesh size and smaller and up to 30 percent by weight of a 200–350-mesh size.

4,706,892

METHOD AND SYSTEM FOR THE PREPARATION OF A HIGHLY CONCENTRATED MINERAL SLURRY HAVING SUBSTANTIALLY CONSTANT IDENTIFYING CHARACTERISTICS

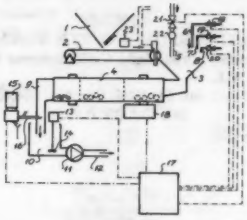
Reinhard Klose, Cramme, Fed. Rep. of Germany, assignor to Salzgitter Industriebau GmbH, Salzgitter, Fed. Rep. of Germany

Filed Mar. 17, 1986, Ser. No. 840,445

Claims priority, application European Pat. Off., Jul. 30, 1985, 85109553.9

Int. Cl.[4] **B02C** *23/18*

U.S. Cl. 241—16 **8 Claims**



1. A method for the continuous production of a substantially constant efflux of a highly concentrated mineral slurry comprising a finely ground mineral material, a liquid and at least one additive, said mineral slurry having a substantially constant viscosity, a substantially constant ratio of dry weight of said mineral material to total liquid, and a minimal variance of particle size distribution of said finely ground mineral material, said efflux of mineral slurry supplying a substantially constant dry weight of said mineral material per unit of time, said method comprising the steps of:

(a) providing a first flow comprising said mineral material in a coarsely ground state and said liquid, said first flow having a substantially constant ratio of equivalent dry weight of said mineral material to total liquid, said step of providing said first flow comprising the substeps of:

(1) providing a stream of said mineral material in said coarsely ground state;

(2) continuously determining the moisture content of said stream of said mineral material;

(3) providing a stream of said liquid; and

(4) adjusting the flow rate of said stream of said liquid according to said continuously determined moisture content;

(b) providing a variable second flow of said at least one additive;

(c) combining said first and second flows and simultaneously

mixing and comminuting said resulting combined flow to produce said mineral slurry;

(d) determining the viscosity of said so produced mineral slurry; and

(e) adjusting said second flow of said at least one additive to maintain said viscosity of said mineral slurry substantially constant.

4,706,893

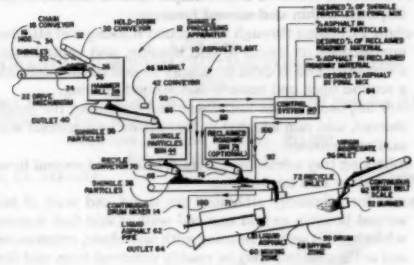
METHOD AND APPARATUS FOR RECYCLING ROOFING SHINGLES AS AN ADDITIVE TO ASPHALT PAVING COMPOSITION

James D. Brock, Chattanooga, Tenn., assignor to Astec Industries, Inc., Chattanooga, Tenn.

Filed Jul. 7, 1986, Ser. No. 882,475

Int. Cl.[4] B02C *19/12*

U.S. Cl. 241—23 **34 Claims**



1. An asphalt plant comprising:

means for heating and drying measured amounts of virgin aggregate;

means for comminuting asphaltic roofing shingles having a known percentage by weight of asphalt to particles of a size which can be accurately flowed and metered;

means for introducing said shingle particles into said asphalt plant such that said shingle particles are heated to melt the asphalt in said shingle particles and mixed with said virgin aggregate to from a mixture;

means for introducing measured amounts of liquid asphalt into said asphalt plant;

means for mixing said liquid asphalt with said mixture of shingle particles and virgin aggregate to form an asphalt paving composition;

means for measuring the amount of shingle particles introduced into said asphalt plant, whereby the amount of asphalt introduced into said asphalt plant as a result of the introduction of said shingle particles can be calculated based upon the measured amount of shingle particles and the known percentage of asphalt in said shingle particles; and

means for controlling the amount of liquid asphalt introduced into said asphalt plant such that the total amount of asphalt in said paving composition from said shingle particles and from said liquid asphalt constitutes a desired proportion of said paving composition.

4,706,894

PROCESS OF PRODUCING A MECHANICALLY ALLOYED COMPOSITE POWDER

Manfred Rühle, Obertshausen, and Peter Wincierz, Steinbach, both of Fed. Rep. of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jul. 10, 1986, Ser. No. 884,250

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1985, 3525056

Int. Cl.[4] B02L *23/00*

U.S. Cl. 241—30 **3 Claims**

1. In a process of producing a mechanically alloyed composite power, including preparing a mixture of powders consisting of materials which are at most only partly soluble in each other when in a liquid state, said mixture consisting of at least one metallic powder and at least one non-metallic powder or a plurality of different metallic powders, and grinding said mixture in a drum mill by introducing a large quantity of energy into the mixture being ground, the improvement wherein the step of grinding comprises: grinding the mixture in a centrifugal mill having a cylindrical grinding drum, which rotates about its own axis and simultaneously revolves on an orbit about a stationary axis of revolution, which is parallel to the axis of the grinding drum and within the cross-section of the grinding drum, at an angular velocity which has a constant ratio to the angular velocity at which the drum rotates about its own axis, and driving the drum to rotate same about its own axis to cause the grinding drum to revolve in an orbit described by the axis of the grinding drum.

4,706,895

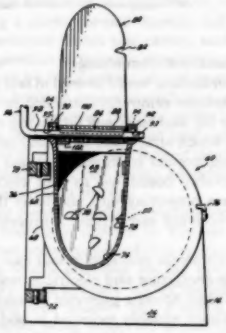
PUSHER PLATE HANDLE FOR A SHREDDER ATTACHMENT OF A FOOD PROCESSOR

Melvin E. Bricker, Cincinnati, Ohio, assignor to Bricker Products, Inc., Cincinnati, Ohio

Filed Jan. 27, 1987, Ser. No. 6,740

Int. Cl.[4] B02C *18/22, 25/00*

U.S. Cl. 241—37.5 **3 Claims**



1. A food procesor having a shredder attachment for shredding food product, comprising:

a housing;

a slicer plate rotatable within said housing for slicing food product;

a feed chute mounted to said housing, said feed chute being movable between a closed position against said housing and an open position spaced from said housing;

a pusher plate movable within said feed chute for urging food product received within said feed chute into contact with said slicer plate, said pusher plate being formed with a first locking element accessible from either side of said pusher plate;

handle means formed with a second locking element mate-

able with said first locking element of said pusher plate, said second locking element being movable into locking engagement with said first locking element from either side of said pusher plate to releasably connect said handle means to either side of said pusher plate;

means for rotatably mounting said handle means and said pusher plate to said feed chute with said pusher plate in a predetermined position relative to said feed chute, and for preventing disengagement of said handle means from said pusher plate to permit cleaning of said pusher plate except when moving said pusher plate to said predetermined position;

stop means for preventing movement of said pusher plate to said predetermined position when said feed chute is in said closed position against said housing.

4,706,896

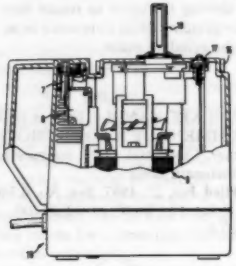
FOOD PROCESSOR

David T. Moon-Kau, Kowloon, Hong Kong, assignor to Chiaphua Industries Limited, Hong Kong

Filed Jun. 11, 1986, Ser. No. 872,959

Int. Cl.[4] B02C *25/00*

U.S. Cl. 241—37.5 **11 Claims**



1. A food processor, comprising:

a base unit; an electric motor housed in said base unit; a bowl having a bottom removably attached to said base unit; a removable lid, said bowl and lid having mutually engageable parts which attach said lid to said bowl when said lid is in a fixed angular relationship to said bowl; and drive means drivably connected to said electric motor, said drive means projecting into said bowl through said bottom for receiving and driving a processing tool in said bowl;

electric switch means provided in said base unit for energizing and de-energizing said electric motor;

a switch actuator housing provided on said bowl;

a switch actuator slidably mounted in said switch actuator housing for movement between a first position in which said electric switch means in use de-energizes said electric motor and a second position in which said electric switch means in use energizes said electric motor;

spring means urging said switch actuator to its first position;

a switch button housing provided on said lid of said bowl;

a switch button slidably mounted in said switch button housing for movement between a first and a second position;

spring means urging said switch button to its first position, said switch button being movable manually against an urging force of a spring to its second position to prevent removal of said lid and to move said switch actuator to its second position when said lid is attached to said bowl; and

a selectively operable locking member for releasably holding said switch button in its second position.

4,706,897

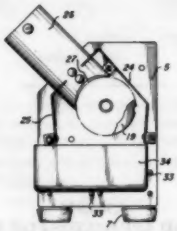
APPARATUS FOR COMMINUTING BONE

Rudolph H. Moeller, Royal Palm Beach, Fla., assignor to Bio-Dynamic Technologies Inc., Pompano Beach, Fla.

Filed Oct. 29, 1986, Ser. No. 926,440

Int. Cl.[4] B02L *18/22*

U.S. Cl. 241—37.5 **6 Claims**



1. An apparatus for use in comminuting bone to substantially homogeneous particles which comprises,

a first housing having a pair of end walls,

a motor mounted in said first housing,

an output shaft on said motor, said output shaft extending through one of said end walls,

a second housing having a single end wall,

a comminuter mounted on the output shaft of said motor and disposed within said second housing,

a chute extending through said second housing and attached intermediate its length to said housing, said chute having a first open end in close proximity to said comminuter and a second open end outside said second housing,

a ram disposed within said chute and extending the length thereof, said ram adapted to force bone into contact with said comminuter,

a collecting tray releasably engaged inside said second housing below said comminuter,

means for releasably attaching the singel end wall of said second housing to said one end wall of said first housing whereby said second housing with said chute, comminuter and collecting tray may be readily removed from said first housing for sterilization purposes.

4,706,898

CRUSHING MACHINE WITH A REMOVABLE OUTLET GRATE

Joachim Schönfeld, Willich; Hans-Günter Lapp, Ratingen, and Gabriele Greiner, Monchen-Gladbach, all of Fed. Rep. of Germany, assignors to Lindemann Maschinenfabrik GmbH, Fed. Rep. of Germany

Filed May 27, 1986, Ser. No. 867,911

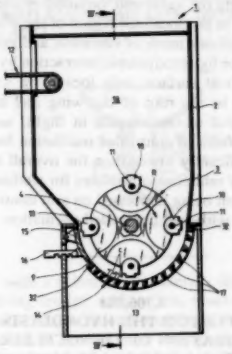
Claims priority, application Fed. Rep. of Germany, May 31, 1985, 3519516

Int. Cl.[4] B02L *13/02*

U.S. Cl. 241—73 **11 Claims**

1. Crushing machine comprising a housing having a number of upwardly extending walls forming a crushing space having a lower end and an upper end with said walls including a pair of oppositely spaced first walls, a rotor mounted within said housing for rotation about a horizontal axis and having an axis extending between said first walls, said rotor having a plurality of crushing tools mounted thereon, an inlet in said housing for introducing material to be crushed into said housing, an outlet grate at the lower end of said crushing space below said rotor and extending in the circumferential direction of said rotor and having a circumferential extent, said grate comprising a plurality of grate rods extending parallel to the axis of said rotor, at least one opening in at least one of said first walls in the region of said grate, wherein the improvement comprises that said at least one opening is in at least partial axial alignment with said

outlet grate and extends for the circumferential extent of said grate, said outlet grate is supported in said opening and is removable in the axial direction thereof from said housing through said opening, said grate comprises a plurality of rods individually removable through said opening in said housing,



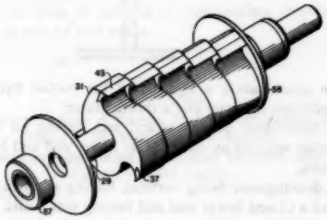
means at said opening for securing said rods against displacement in the axial direction of said rotor axis, and means for spacing said grate rods apart in the direction of rotation of said rotor and for varying the impact angles between said grate rods and the material to be crushed.

4,706,899

GRANULATOR WITH CUTTING TONGUE ROTOR KNIFE

Frank Parker, and Leslie M. Parker, both of Old Brandon Rd., Hillsboro, Tex. 76645

Filed Oct. 27, 1980, Ser. No. 201,041
Int. Cl.[4] B02C *18/06*
U.S. Cl. 241—73 **2 Claims**



1. An improved granulator for comminuting scrap material, comprising in combination:

at least one bed knife mounted stationarily in the granulator;

a rotatably driven rotor axle mounted parallel with the bed knife;

a plurality of disk-shaped blades mounted in side-by-side contact with each other on the axle for rotation therewith, each blade having a peripheral contour with a plurality of spaced-apart cutting tongues extending therefrom;

each of the cutting tongues being of metal and having a tip portion in the forward portion of the tongue; and

an arcuate perforated screen mounted below the blades for the passage of comminuted material; the cutting tongues, when the axle is rotated, defining a circular path closely spaced from the bed knife and screen;

the blades being staggered so that not all of the tip portions pass the bed knife at the same time;

each blade having a peripheral contour comprising:

a partially cylindrical region on the top of each cutting tongue that includes the tip portion and proceeds opposite the direction of rotation a selected circumferential distance, the cylindrical region having a radius equal to the radius of the circular path;

a curved region on the rear side of each cutting tongue immediately following the cylindrical region and comprising a continuous, smooth, inward, spiral curvature to a point of minimum radial thickness; and

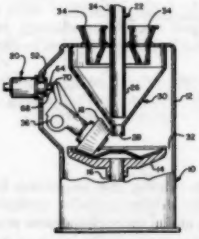
a step region beginning at the point of minimum radial thickness and curving smoothly outward in a continuous curve to the top of tip portion, defining the forward side of each cutting tongue.

4,706,900

RETROFITABLE COILED SPRING SYSTEM

Robert S. Prairie, and Frank J. Paskowski, Jr., both of Pittsfield, Mass., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Aug. 15, 1985, Ser. No. 765,976
Int. Cl.[4] B02C *15/00*
U.S. Cl. 241—121 **4 Claims**



1. A mechanical coil spring assembly for a bowl mill comprising:

(a) a preload stud means including a spring preload stud and a spring stud insert, said spring preload stud having an enlarged portion formed at one end thereof, said enlarged portion having a cavity formed therein, said spring stud insert being mounted within said cavity, said spring stud insert being operative to transmit therethrough the spring forces generated by the mechanical coil spring assembly;

(b) stud bearing housing means including a stud bearing housing, said stud bearing housing encircling said enlarged portion of said spring preload stud, said stud bearing housing first mounting means formed therein for use in securing the mechanical coil spring assembly on a bowl mill in mounted relation thereto;

(c) pressure spring means including a journal pressure spring supported in encircling relation to said spring preload stud, said journal pressure spring being operative to generate the spring forces provided by the mechanical coil spring assembly, said pressure spring means further including a spring stud adapter and a spring guide, said spring stud adapter being supported in encircling relation to said spring preload stud, said spring stud adapter forming one seat for said journal pressure spring, said spring guide being mounted in encircling relation to said spring preload stud, said spring guide forming the other seat for said journal pressure spring; and

(d) said housing means including a spring housing and a housing adapter plate, said spring housing means further including means for securing said housing adapter plate to said spring housing, said spring housing encircling said journal pressure spring so as to provide an enclosure therefor, said housing adapter plate encircling said journal pressure spring, said housing adapter plate having second mounting means formed therein for use in securing the mechanical coil spring assembly on a bowl mill in mounted relation thereto, said spring housing means fur-

ther including a spring housing cover and means for securing said spring housing cover to said spring housing, said spring housing cover encircling the other end of said spring preload stud.

4,706,901

PROPULSION UNIT SUSPENSION FOR VEHICLES, ESPECIALLY FOR PROPELLER DRIVEN AIRCRAFTS

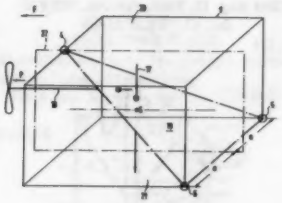
Ulrich von Broock, Weissach, and Jürgen Hawener, Stuttgart, both of Fed. Rep. of Germany, assignors to Dr. Ing.h.c.F. Porsche Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Sep. 18, 1985, Ser. No. 777,440

Claims priority, application Fed. Rep. of Germany, Sep. 20, 1984, 3434453

Int. Cl.[4] B64D *27/00*

U.S. Cl. 244—54 **18 Claims**



1. A three point bearing unit suspension for vehicles, especially for propeller driven aircrafts, comprising: a propeller driven propulsion unit, a supporting frame means for absorbing propeller thrust as well as gravity forces of the propulsion unit and which supporting frame means is supported at a fire wall means, bearing means solely retaining the propulsion unit at said supporting frame means at only three points, the three points being arranged with respect to one another in two horizontal planes offset in height, a line of action of the gravity and a further line of action of the propeller thrust extending through an ideal plane delimited by the three points.

4,706,902

ACTIVE METHOD AND INSTALLATION FOR THE REDUCTION OF BUFFETING OF THE WINGS OF AN AIRCRAFT

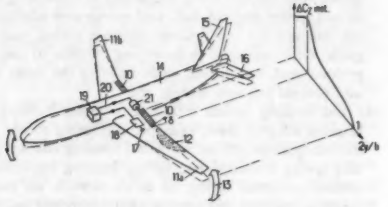
Roger Destuynder, Noisy le Sec; Jacques Bouttes, and Philippe Poisson-Quinton, both of Paris, all of France, assignors to Office National d'Etudes et de Recherche Aerospatiales, France

Continuation-in-part of Ser. No. 522,258, Aug. 11, 1983, abandoned. This application May 6, 1985, Ser. No. 731,161

Claims priority, application France, Aug. 11, 1982, 82 13998

Int. Cl.[4] B64C *13/16*

U.S. Cl. 244—76 C **10 Claims**



1. Method for reducing the stresses due to buffeting of an aircraft wing, said method comprising:

continuously measuring at least one parameter representative of the amplitude, frequency and phase of buffeting in an aircraft wing; generating an electrical signal representative of said parameter; subjecting said electrical signal to filtering for isolating the amplitude, frequency and phase of at least one mode of vibration of wing caused by buffeting; computing the value and variation of alternate forces to be applied in one localized region of the wing for damping at least said one mode of vibration; and generating said alternate force by aerodynamic interaction by actuation of a single control surface only located in said localized region close to the root of the wing and also used for regular control of the aircraft in flight, said actuation being in the form of controlled oscillation having an amplitude significantly lower than the overall amplitude of movement of said control surfaces for stationary control, said movement being impressed on said control surface in combination with said controlled oscillation.

4,706,903

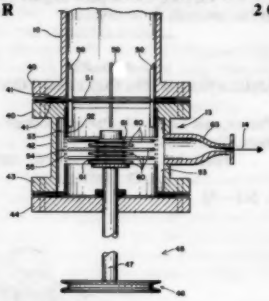
APPARATUS FOR THE HYDROLYSIS AND DISINTEGRATION OF LIGNOCELLULOSIC

David L. Brink, Berkeley; Michael M. Merriman, San Pablo, both of Calif., and David A. Mixon, Warren, N.J., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Sep. 21, 1984, Ser. No. 653,065

Int. Cl.[4] B02C *13/18;* **C13K** *1/00, 1/02*

U.S. Cl. 241—188 R **2 Claims**



1. In combination a hydrolyzer for partial hydrolysis of lignocellulosis material and a disintegrator,

said hydrolyzer being vertical and having an inlet at its upper end and an outlet at its lower end and having side walls,

said disintegrator being vertical, having an open upper end and a closed lower end and having side walls,

said disintegrator being arranged in vertical alignment with the lower end of the hydrolyzer and forming therewith a continuous passage to cause continuous, vertical flow of particles of hydrolyzed solids from the hydrolyzer into the disintegrator,

the disintegrator comprising a cylinder having between its ends a perforated wall portion, and disintegrating means rotatable within the cylinder about the axis of the cylinder in close proximity to the perforated wall portion of the cylinder, drive means for said disintegrating means and an outlet to receive slurry expelled from the cylinder through the perforated portion thereof,

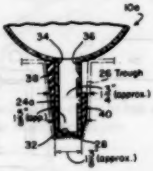
there being also baffle members in the form of bars at the junction of the hydrolyzer and the disintegrator which serve to prevent vortex formation and commingling of material in the disintegrator with material in the hydrolyzer, said bars extending substantially vertically and extending into both the hydrolyzer and the disintegrator and adjacent to the side walls of both the hydrolyzer and the disintegrator.

4,706,904

CASSETTE ASSEMBLY, FOR USE WITH, AND IN COMBINATION WITH, A ROLLED SHEET MATERIALS DISPENSER

Gary E. Raymond, 755 S. Rainbow Dr., Hollywood, Fla. 33021

Filed Apr. 8, 1986, Ser. No. 850,507
Int. Cl.[4] B65D *85/67*; B65H *19/00*; G03B *1/04, 17/26*
U.S. Cl. 242—55.53 12 Claims



1. For use with a rolled sheet materials dispenser having a cassette-receiving trough with a first, innermost length of a given dimension, and a second, outermost length of another dimension which is greater than said given dimension, and having a first, outermost portion with a width of a prescribed dimension, and a second, inner portion with a width of a specific dimension which is smaller than said prescribed dimension, a cassette assembly, comprising:

a first, rolled sheet materials-confining section; and

a second, rolled sheet materials-out-feeding section coupled to said first section; wherein

said second section has a trough-engaging portion with means for (a) forming said trough-engaging portion with an overall, effective width of a dimension which is substantially equal to such specific dimension of such a sheet materials dispenser trough, and (b) defining thereat, upon said out-feeding section being mated with such trough, a light-tight, sealing fit of said trough-engaging portion with such second, inner portion of such trough;

said means comprise substantially parallel walls projecting from said first section; and

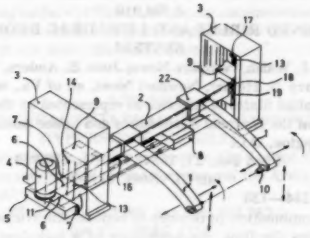
at least one strip of material of light-sealing property adhered to one of said walls.

4,706,905

REEL STAND

Manuel Torres, Sancho el Fuerte, 21, 31007 Pamplona, Spain

Filed Jul. 30, 1986, Ser. No. 891,875
Claims priority, application Spain, Sep. 10, 1985, 546831
Int. Cl.[4] B65H *19/12*
U.S. Cl. 242—68.4 7 Claims



1. A reel stand for handling rolls of paper comprising:

(a) two laterally spaced columns;

(b) a main support shaft, horizontally positioned between said two columns, one end of said support shaft movably connected to one of said columns, the other end of said support shaft movably connected to the other column;

(c) two arms, one end of each said arm connected to said support shaft;

(d) roll engagement means mounted at the other end of each said arm for engaging saids rolls of paper; and,

(e) power means for providing said arms and support shaft with three movements,

a first movement for horizontally moving said arms relative to one another towards and away from each other to adjust the space between said roll engagement means, thereby allowing said roll engagement means to engage and disengage said roll,

a second movement for vertically moving said arms and said support shaft relative to a first plane that intercepts both columns, up and down in a second vertical plane which is parallel to said first vertical plane, thereby adjusting the height of said roll engagement means relative to said roll,

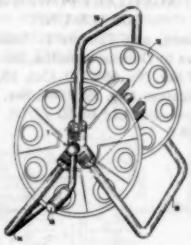
a third movement for rotationally moving said arms.

4,706,906

THREE-ARM HUB JOINT FOR TUBULAR STRUCTURES SPECIFICALLY FOR HOSE RACKS AND HOSE CARTS

Gianfranco Roman, Pasiano, and Romeo Boraso, Corva di Azzano Decimo, both of Italy, assignors to Claber, S.p.A., Fiume Veneto, Italy

Filed May 8, 1986, Ser. No. 860,828
Claims priority, application Italy, Jun. 21, 1985, 22239/85 [U]
Int. Cl.[4] B65H *75/38*
U.S. Cl. 242—86 2 Claims



1. A hub joint for tubular structures, specifically for hose racks and carts comprising:

a single body with three coplanar radial arms converging in a single center, each of said arms having an axial seat with a blind bottom to receive one end of a respective tubular structural part and said body being traversed by a central hole perpendicular to said arms for receiving a rotation hub; and

wherein each of said arms is fitted with locking tabs projecting from threaded tangs on which may be screwed ring nuts having converging surfaces capable of forcing said locking tabs in gripping engagement with their respective tubular structural part.

4,706,907

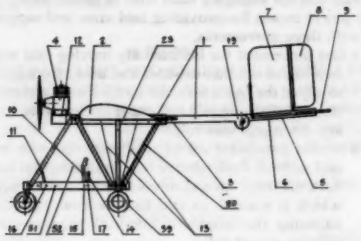
AIRCRAFT

Eduard Kopylov, 2335 S. Dawson Way, Aurora, Colo. 80014

Filed Jan. 29, 1985, Ser. No. 696,165
Int. Cl.[4] B64C *3/56*
U.S. Cl. 244—49 5 Claims

1. An aircraft geometrically transformable pilot compartment consisting of a lower floor frame, an upper frame containing a part of a fuselage boom and a plurality of connecting members which pivotally connect said lower floor frame and said upper frame; said connecting members form two groups (left and right) located respectively on left and right sides from longitudinal center axis of said part of a fuselage boom; each of said groups include front and rear said connecting members; said lower floor frame, said upper frame and said two groups of

said connecting members form together left and right parallelogram structural contours of said pilot compartment; and



further said lower floor frame and said upper frame can be moved relative to one another in longitudinal direction transforming said parallelogram stuctural contours into rectangles.

4,706,908

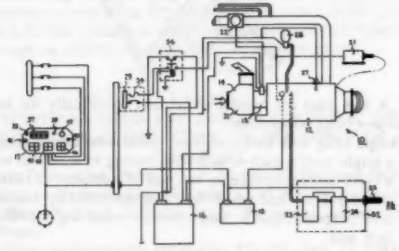
LIGHTWEIGHT AUXILIARY POWER AND FORCED AIR SUPPLY UNIT

Joseph G. Huffman, and Thomas L. Seidl, both of Lincoln, Nebr., assignors to Duncan Aviation, Inc., Lincoln, Nebr.

Continuation of Ser. No. 659,220, Oct. 10, 1984, abandoned. This application Aug. 29, 1986, Ser. No. 901,690

Int. Cl.[4] B64D *13/06*

U.S. Cl. 244—118.5 **21 Claims**



1. An auxiliary power and forced air supply unit for use on a vehicle having an on-board air conditioning unit, the auxiliary power and forced air supply unit comprising:

(a) a turbine unit for creating rotational energy;

(b) a generator unit operably connected to said turbine unit for converting at least a portion of said rotational energy into electrical enregy for use by said vehicle and said air conditioning unit; and

(c) a forced air unit operably connected to said turbine unit for converting at least a portion of said rotational energy into a flow of air, which flow of air can be utilized by said air conditioning unit to aid in cooling air that will be input into a cabin of said vehicle; wherein said forced air unit comprises a fan affixed to said generator unit, such that rotational energy from said turbine unit will be directly transferred through said generator unit to said fan; and wherein said auxiliary power and forced air supply unit weighs less than two hundred pounds when operably installed in said vehicle.

4,706,909

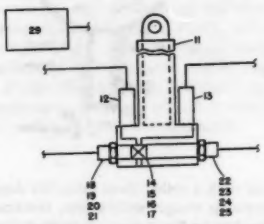
CONTROLLABLE EJECTION SEAT CATAPULT

Jess A. Cuevas, Scottsdale, and Robert D. Blackshire, Glendale, both of Ariz., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jun. 19, 1986, Ser. No. 876,585

Int. Cl.[4] B64D *25/10*

U.S. Cl. 244—122 AC **3 Claims**



1. A seat ejection system which is fixed to an ejection seat and is capable of ejecting said ejection seat with controllable acceleration, said seat ejection system comprising:

a means for controlling said seat ejection system which is electronically connected to said seat ejection system and monitors its acceleration, said controlling means sending a first set of signals to increase acceleration if it is inadequate, said controlling means sending a second set of signals to decrease acceleration when it is too great;

a frame which is attached to said ejection seat and said controlling means;

a main catapult tube which is attached to said frame;

a piston housed within said main catapult tube which drives said frame and said ejection seat to eject when solid propellant combusts within said frame;

a first solid propellant charge which is attached to said frame and provides solid propellant to combust within said tube when ejection is required;

a means for providing additional propellant when increased acceleration is required, said providing means thereby increasing the acceleration when receiving said first set of signals from said controlling means; and

a means for venting pressure from said main catapult tube when receiving said second set of signals from said controlling means, said venting means thereby providing decreased acceleration when required.

4,706,910

COMBINED RIBLET AND LEBU DRAG REDUCTION SYSTEM

Michael J. Walsh, Newport News; John B. Anders, Yorktown, and Jerry N. Hefner, Newport News, all of Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Dec. 27, 1984, Ser. No. 686,959

Int. Cl.[4] B64C *21/10*

U.S. Cl. 244—130 **12 Claims**

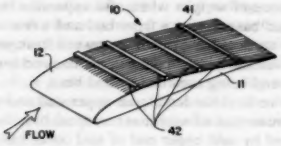
1. A combination of devices to reduce skin friction drag by controlling the flow characteristics of a turbulent boundary layer, such that both vertical and horizontal oscillations in the flow are damped, resulting in a substantial reduction in aerodynamic noise and retarded pressure fluctuations that lead to flutter modes, comprising:

a flow surface with an attached turbulent boundary layer;

riblet means on said flow surface;

large-eddy break-up means suspended above, parallel to, and

spanwise across the flow surface within the outer edge of the boundary layer and;



means for suspending said large-eddy break-up means within the outer edge of the boundary layer.

4,706,911

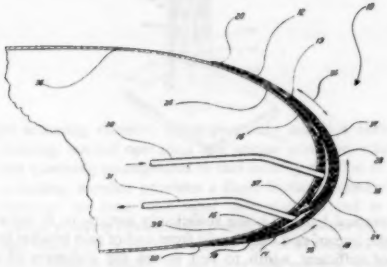
METHOD AND APPARATUS FOR DEICING A LEADING EDGE

James A. Briscoe, 930 N. Portage Rd.; James C. Putt, 120 Vineyard Way, both of Doylestown, Ohio 44230, and Ronald W. Phillips, II, 585 Manning Rd., Mogadore, Ohio 44260

Filed Jan. 27, 1986, Ser. No. 822,972

Int. Cl.[4] B64D *15/18*

U.S. Cl. 244—134 A **20 Claims**



1. A method for deicing a substantially high modulus ice accreting surface upon which ice accumulates comprising the step of:

periodically activating beneath the ice accreting surface at least one inflatable member means of a size, position, and physical configuration such that activation of the inflatable member distorts the ice accreting surface placing chord-wise strain upon substantial portions of the ice accreting surface to an extent sufficient to produce periodic desirable distortion and chord-wise strain in the ice accreting surface sufficient to release accumulations of ice thereon; activation being accomplished to the sufficient extent in not more than 0.250 seconds.

4,706,912

STRUCTURAL EXTERNAL INSULATION FOR HYPERSONIC MISSILES

John S. Perry, Seattle, Wash., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 16, 1985, Ser. No. 808,982

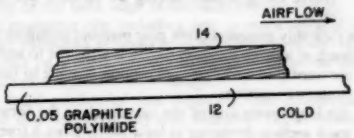
Int. Cl.[4] B64G *1/58*

U.S. Cl. 244—158 A **6 Claims**

1. In a missile having a cylindrical shell structure and disposed for traveling at substantially hypersonic velocities, means for insulating the cylindrical shell structure as well as forming an integral part of the structure of said shell comprising:

a. said cylindrical shell structure being a structural shell forming said missile, and said structural shell being wound layers of graphite/polyimide material with said polyimide material serving as a resin system; and,

b. said means for insulating the cylindrical shell structure being cover means for covering said shell and forming an integral structural assembly therewith, said cover means



being wound layers of ceramic fibers with the same resin system as said shell to form said integral structural assembly when the resin system is cured, and said cover means disposed for ablation responsive to said missile substantially attaining said hypersonic velocities.

4,706,913

VARIABLE CAMBER LEADING EDGE ASSEMBLY FOR AN AIRFOIL

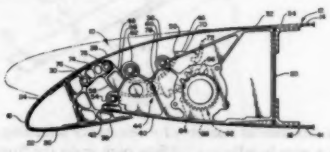
James B. Cole, Mercer Island, Wash., assignor to The Boeing Company, Seattle, Wash.

Continuation-in-part of Ser. No. 474,652, Dec. 28, 1982, Pat. No. 4,475,702. This application Oct. 9, 1984, Ser. No. 658,674

The portion of the term of this patent subsequent to Oct. 9, 2001, has been disclaimed.

Int. Cl.[4] B64C *3/50*

U.S. Cl. 244—214 **12 Claims**



1. A leading edge assembly for an airfoil having an upper surface, a lower surface, a leading edge and a trailing edge, said assembly comprising:

a. a main support structure for the airfoil;

b. a nose section at said leading edge;

c. an upper skin panel having a rear part connected to said structure, a forward part connected to said nose section, and an intermediate flexible panel portion extending between the rear part and the forward part;

d. support and actuating means operatively connected between the nose section and the support structure to move the nose section about a general center of rotation between a first upper position where the flexible panel portion has a lesser degree of curvature and said nose section is more horizontally aligned, to a second lower position where the flexible panel portion has a greater degree of curvature and the nose section is aligned in a more downward slant, in a manner that curvature of the flexible panel portion increases with movement of the nose section toward its second position, said support and actuating means comprising:

(1) a cam track having a forward end connected to said nose section and having a lengthwise axis curved in a generally arcuate configuration about said general center of rotation;

(2) a cam track contact means connecting to said support structure and comprising a forward contact portion and a rear contact portion engaging said cam track at spaced locations along the lengthwise axis to restrain angular

movement of the cam track relative to the cam track contact means;

(3) said cam track having a forward cam track section engaging the forward contact portion for travel along a path having a forward and upward slant, and a rear cam track section engaging the rear contact portion for travel along a path having an upward and rearward slant;

f. a rotatably mounted drive gear member engaging said cam track at a drive location which is adjacent to and radially outwardly of said rear cam section relative to the general center of rotation;

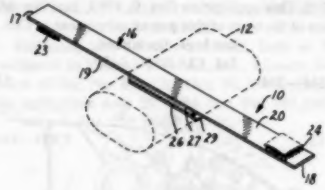
g. the lengthwise axis of the cam track at the forward cam track section deviating at least partly from a true circular arc, in a manner that said general center of rotation shifts during movement of the nose section between the first and second positions, whereby a proper aerodynamic contour of said upper skin panel can be maintained.

4,706,914

ATTACHING ASSEMBLY

Damon R. Ground, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Mian.

Filed Jul. 25, 1986, Ser. No. 890,619
Int. Cl.[4] A47F 5/08
U.S. Cl. 248—74.3 **10 Claims**



1. An attachment assembly for releasably attaching an object such as a wire bundle to a surface such as on the firewall of an automobile, said assembly comprising a flexible polymeric strap having first and second ends and first and second major surfaces, a fastener comprising fastener portions adapted for releasable engagement including a first fastener portion attached on said first surface of said strap adjacent said first end and a second fastener portion attached on said first surface of said strap adjacent said second end, said first fastener portion including a backing having a first length between two ends longitudinally along said strap, and being attached to said strap from the end of said first fastener portion adjacent the first end of the strap to a location generally central along the backing and being unattached to said strap from said generally central location to the end of the backing opposite said first end of the strap so that tension in said strap will cause bending of said strap at generally the center of said backing and the application of forces generally at a right angle to said backing tending to separate said fastener portions, and attachment means adapted for attaching said strap to a surface comprising a layer of pressure sensitive adhesive along said second surface of said strap.

4,706,915

MULTI-SUPPORT DISPLAY STAND FOR HUMAN-SHAPED FIGURES

Joseph M. Cindric, and Mary T. Cindric, both of 6393 Stuart Rd., Adkins, Tex. 78101

Filed Mar. 31, 1986, Ser. No. 846,259
Int. Cl.[4] F16M 11/12; A47F 5/06
U.S. Cl. 248—122 **13 Claims**

1. An adjustable apparatus for holding an inanimate human-shaped figure having legs and an upper torso, said apparatus comprising:

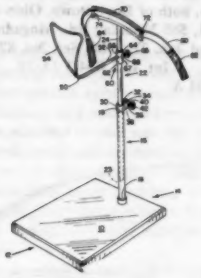
a base for anchoring said apparatus, said base being sized and shaped to deter said apparatus from toppling due to an imbalance of weight when said apparatus holds said figure, said base having a front end and a rear end;

an outer vertical bar extending upward from said base, said outer vertical bar having an upper end and lower end, said lower end being attached to said base;

an inner vertical bar having an upper end and a lower end, said lower end of said inner vertical base being slidably engaged by said upper end of said outer bar;

a first locking means located at said upper end of said outer bar for securing said inner vertical bar and said outer vertical bar relative to each other at any of at least two positions;

a bracket, adjustably supported at one or more positions on said inner vertical bar, said bracket having a rear end and a front end, said rear end being attached to said inner



vertical bar and being sufficiently narrow to fit between the legs of said figure, said front end of said bracket being of sufficient width to rest across the abdomen of said figure;

a second locking means attached to said bracket for securing said bracket to any of at least two positions on said inner vertical bar thereby permitting adjustment for the leg length of said figure;

a lateral support means for supporting said upper torso of said figure against said inner vertical bar, said lateral support means being attached to said upper end of said inner vertical bar, and said lateral support operating independently of said bracket and being adjustable in distance from said base and said bracket by means of

said first locking means thereby permitting adjustment for the torso length of said figure;

a belt attached to said lateral support means, said belt being comprised of soft flexible material, having first and second ends, and a fastening means for securing said first and second ends together.

4,706,916

SUPPORT STAND WITH ADJUSTABLE LEGS

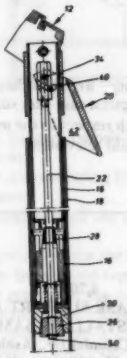
Wolfgang Cullmann, Langenzenn, and Klaus Leinfelder, Oberasbach, both of Fed. Rep. of Germany, assignors to Cullmann Handelsgesellschaft für Verbrauchsgüter mbH, Langenzenn-Laubendorf, Fed. Rep. of Germany

Filed Sep. 30, 1985, Ser. No. 782,425
Int. Cl.[4] F16M 13/00
U.S. Cl. 248—168 **5 Claims**

1. A stand for an item of equipment, comprising a head portion, a plurality of support legs connected to the head portion, each of said support legs comprising inner and outer tubular portions displaceable in telescopic relationship with

each other, said inner tube portion connected to said head portion and said outer portion connected to the inner tube portion;

and a fixing means for fixing the tube portions of each support leg relative to each other, comprising an actuating member on the inner tube portion, a connecting member operatively connected to the actuating member and a clamping arrangement operable by said connecting member and which includes at least one clamping cone member on the connecting member and on the inner tube portion at least one pressure element co-operable with the cone member;



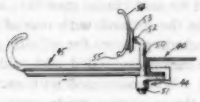
said actuating member being pivotably movable between locking, normal operating and release positions wherein the clamping arrangement in said locking position of said actuating member provides a fixed frictional connection between the inner and outer tube portions and in said release position releases said connection between the inner and outer tube portions whereby said outer tube portion is freely slidable relative to the inner tube portion, while the clamping arrangement in said normal operating position of the actuating member provides for a sliding frictional relationship between the first and second tube portions.

4,706,917

SHELF HOOK FOR MERCHANDISE AND/OR INFORMATION DISPLAY

David R. Thalenfeld, Bear Creek, Pa., assignor to Trion Industries, Inc., Wilkes Barre, Pa.

Filed Jul. 23, 1986, Ser. No. 888,972
Int. Cl.[4] G09F *3/18*
U.S. Cl. 248—205.1 **8 Claims**



1. A display assembly for mounting on a sheet metal shelf or the like wherein the shelf is of the type having a top panel, a front wall and a rearwardly projecting bottom flange, which comprises,

(a) a mounting clip adapted to be mounted on a shelf comprising a body portion adapted to be positioned immediately below the shelf bottom flange and, when so mounted, having front and back end portions extending respectively forwardly of the shelf front wall and rearwardly of the back edge of the shelf bottom flange,

(b) said mounting clip including one or more integral, forwardly extending gripping arms adapted, when said clip is mounted on a shelf, to bear frictionally upon the upper surface of the shelf bottom flange,

(c) the front portion of said mounting clip comprising a socket disposed vertically and, when the clip is mounted, being located directly in front of the shelf front wall,

(d) a separable display device supported by said mounting clip,

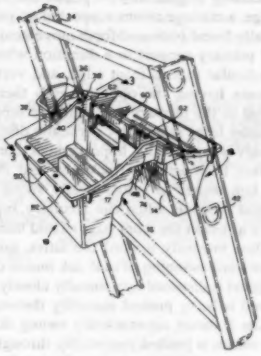
(e) said display device including a vertical shaft portion received in said socket and having a portion extending upward therefrom and, when said clip is mounted on a shelf, being in close confronting relation to the shelf front wall, whereby to lock the assembled mounting clip and display device in mounted position on a shelf.

4,706,918

LADDER ACCESSORY

Randall J. Wilson, Don Mills, Canada, assignor to Wilson Reil Associates Limited, Ontario, Canada

Filed May 1, 1987, Ser. No. 44,654
Int. Cl.[4] E06C *7/14, 5/32*
U.S. Cl. 248—210 **6 Claims**



1. Ladder accessory comprising:

for use on a sloping ladder, comprising:

outer means defining an outer upwardly open receptacle for location on the outside of said ladder,

inner means defining an upwardly opening receptacle for location on the inside of said ladder,

said inner means being dimensioned to extend between the uprights of said ladder,

connecting means connecting said outer and inner means,

said outer, inner and connecting means being shaped to define a transverse downwardly open groove wide enough to receive a rung of said ladder,

support members on said connecting means for resting on a rung of said ladder when said rung is in said groove,

means for cooperation with an upright of said ladder for defining the transverse location of said inner and outer means relative to said ladder with said connecting means extending between said uprights,

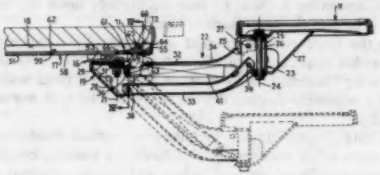
means for maintaining said inner and outer means in an attitude where they are at approximately the same height when said connection means is located upon said rung.

4,706,919

KEYBOARD SUPPORT WITH AUTOMATIC LOWERING MECHANISM

Edward D. Soberalski, Belmont, and Craig Miller, Georgetown Township, Kent County, both of Mich., assignors to Haworth, Inc., Holland, Mich.

Filed Dec. 17, 1986, Ser. No. 943,521
Int. Cl.[4] A47F 5/00
U.S. Cl. 248—281.1 **9 Claims**



1. In combination, a primary work support having an enlarged substantially planar upper surface and a front edge, an auxiliary shelflike support having a substantially planar upper surface adapted for supporting a keyboard thereon, and a support mechanism connecting the primary and auxiliary supports together for permitting the auxiliary support to be selectively vertically positioned in spaced relationship outwardly from the front edge and for additionally permitting the auxiliary support to be moved into a storage position beneath the primary support, said support mechanism including an elongated guide track fixed to the underside of said primary support and extending in generally perpendicular relationship to said front edge, a carriage means supported on said guide track for substantially linear back-and-forth movement adjacent and beneath said primary support in a direction which is substantially perpendicular to said front edge, and vertically swingable link means having the opposite ends thereof pivotally interconnected to the primary and auxiliary supports for permitting the latter to be selectively vertically displaced relative to the primary support, the improvement comprising cam means coacting between said track and said link means for causing the link means to automatically swing downwardly into a lowered position when the auxiliary support is positioned closely adjacent the front edge of said main support and is being pushed inwardly toward the latter, said cam means causing downward swinging of said link means only when the auxiliary support is disposed horizontally closely adjacent said front edge and is being pushed inwardly theretoward so that the link means is hence automatically swung downwardly as the carriage means is pushed rearwardly through only a small extent so that the auxiliary support will pass freely under the primary support.

4,706,920

TELEVISION STAND HAVING A TILT MECHANISM

Juji Ojima, and Yosiharu Kitamura, both of Aikawa, Japan, assignors to NHK Spring Co. Limited, Kanagawa, Japan

Division of Ser. No. 702,125, Feb. 15, 1985, Pat. No. 4,643,382.
This application Nov. 14, 1986, Ser. No. 930,499
Claims priority, application Japan, Feb. 29, 1984, 59-029062[U]
Int. Cl.[4] A47G 29/00
U.S. Cl. 248—371 **8 Claims**

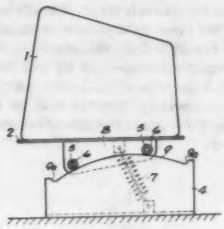
1. A television stand comprising:

a base stand,

a movable member pivotably supported on said base stand for supporting a television,

a tilt mechanism including a cam surface formed by said movable member and a pressurized movable device abutting said cam surface for positioning of said movable member, and

a guide rail mounted on said base stand, said movable device being slidably mounted on said guide rail,



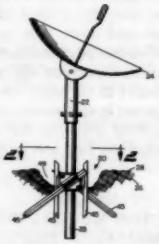
said cam surface being formed so that the bias force of said movable device against said cam surface corresponds to a balanced force with respect to the moment of rotation due to the weight of said television.

4,706,921

ANTENNA POST BASE SUPPORT AND METHOD OF INSTALLING SAME

Dale W. Paulin, 1242 Colonial Dr., Ashland, Ohio 44805

Filed Jan. 17, 1986, Ser. No. 819,717
Int. Cl.[4] A45F 3/44
U.S. Cl. 248—545 **12 Claims**



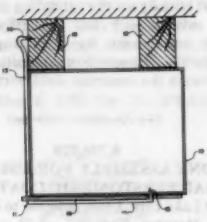
1. A base support for supporting a generally vertical antenna post in ground containing randomly located obstructions such as rocks, said base support comprising a pair of clamp members adapted for assembly with each other to encircle said post, means for drawing said clamp members into tight engagement with said post, a plurality of rods to be driven into the ground at angles transverse to said post, guide means secured to said clamp members and associated with each of said rods for slidably receiving an associated one of said rods as said rod is driven into the ground, and adjustment means for repositioning said guide means with respect to said clamp members upon encountering an obstruction in the ground with one of said rods, said adjustment means including means for adjusting the angle of said one of said guide means associated with said rod with respect to said post, and a bolt associated with each of said guide means for securing the respective guide means and clamp members to each other, said guide means having an opening providing access to said bolt upon removal of the rod associated with the guide means, said rod blocking access to said bolt through said opening upon receipt of said rod in the associated guide means.

4,706,922

HANGAR FOR FIBERGLASS DUCTS

Terry K. Grow, 1258 N. 700 East, Bountiful, Utah 84010

Filed Apr. 21, 1986, Ser. No. 854,007
Int. Cl.[4] F16M *13/00*
U.S. Cl. 248—546 2 Claims



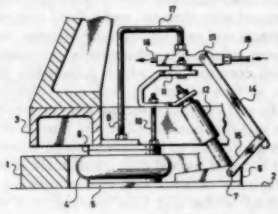
1. A fiberglass duct hangar comprising
a vertical support arm;
a horizontal support arm extending from a bottom end of the vertical support arm;
a sharpened hook angled from the top end of the vertical support arm;
a spike extending upwardly from the horizontal support arm at an end opposite the vertical support arm; and
a flat support plate resting on the horizontal support arm, said flat support plate having a hole therethrough through which the spike extends and a slot extending inwardly from an edge thereof in which the vertical support arm is positioned.

4,706,923

RESILIENT MOUNTING OF A CENTRIFUGE

Oldrich Krejcir, Liberec; Bohuslav Zajic, and Pavel Saroun, both of Hradec Kralove, all of Czechoslovakia, assignors to Vysoka skola strojni a textilni, Liberec, Czechoslovakia

Filed Mar. 21, 1986, Ser. No. 842,444
Int. Cl.[4] F16M *1/00*
U.S. Cl. 248—638 4 Claims



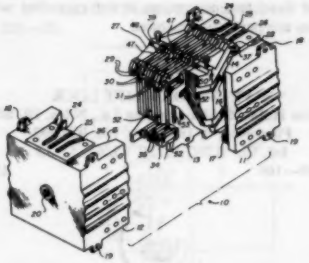
1. A resilient mounting of a centrifuge having a supporting frame, the supporting frame of the centrifuge being seated on a subsurface in an elastic way, comprising
at least three vibration insulating units situated between the supporting frame and the subsurface, wherein each of said units consists of
at least one pneumatic spring;
a controller of static height;
at least one vibration damper, wherein the pneumatic spring is connected to a source of pressurized air via said controller of static height, and the vibration damper absorbs vibrations of the working frame of the centrifuge.

4,706,924

STACK MOLD

Pierre J. de Larosiere, 30 Duque de Palmela, 4C, 1200 Lisbon, Portugal

Filed Apr. 13, 1984, Ser. No. 599,980
Int. Cl.[4] B29C *33/04, 45/43, 45/66*
U.S. Cl. 249—161 18 Claims



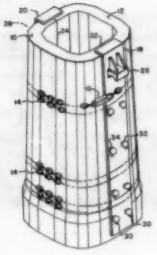
1. A stack mold, comprising:
a pair of mold halves arranged to move toward and away from one another along an axis of movement between platens of a press;
a plurality of mold plates arranged in a stack between the mold halves, said mold plates being disposed in planes substantially parallel to the axis of movement of said mold halves; and
said mold plates and mold halves having shaped surfaces formed thereon such that a wedging action is exerted on the mold plates as the mold halves close toward one another, thereby pressing the mold plates together.

4,706,925

METHOD OF STRIPPING AN INGOT FROM A SECTIONAL INGOT MOLD AND AN IMPROVED SECTIONAL INGOT MOLD THEREFOR

George D. Ratliff, Jr., Pittsburgh, Pa., assignor to USX Engineers & Consultants, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 349,400, Feb. 16, 1982, abandoned.
This application Nov. 2, 1983, Ser. No. 548,059
Int. Cl.[4] B22D *7/08*
U.S. Cl. 249—162 6 Claims



1. An ingot mold, comprising:
a plurality of mold sections assembled together so that the inner surfaces of said sections define an elongated mold cavity extending axially in a generally vertical direction,
said mold cavity forming an opening of sufficient cross-section in one end of said mold to permit removal of an ingot longitudinally therethrough,
said mold sections having juncture surfaces each extending longitudinally in a direction generally parallel to the axis of said mold cavity,

fixed metal fastener means for reversibly coupling said mold sections together in assembled relation,

means for partially separating in a transverse direction at least some of the mold sections and elastically deforming said fixed metal fastener means, creating a gap between adjoining juncture surfaces of said mold sections, and

mechanical stop means for limiting the maximum separation distance between the mold sections so that the elastic limit of said fixed fastener means is not exceeded when said sections are partially separated.

4,706,926

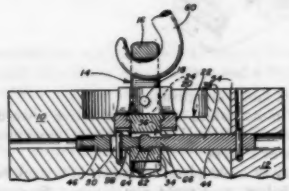
SAFETY MOLD LIFT LOCK

John W. Von Holdt, 6864 Lexington La., Niles, Ill. 60648

Filed Nov. 8, 1986, Ser. No. 928,902

Int. Cl.[4] B29C *33/20, 45/64, 51/38*

U.S. Cl. 249—169 **15 Claims**



1. In a mold comprising mold halves separable along a parting line, and a lifting handle carried by one of said mold halves, said handle being rotatable between a first position in which the handle lies generally flat against the mold and a second position in which the handle extends outwardly from the mold to permit engagement by a lifting member, the improvement comprising, in combination: first means preventing rotation of said lifting handle from the first to the second position when the mold halves are separated along said parting line by more than a predetermined distance.

4,706,927

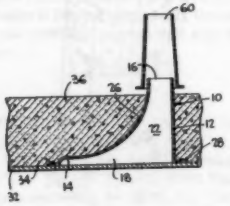
FORM FOR PRODUCING ARCUATE BORES IN POURED CONCRETE SLABS

Robert Lawall, 4200 Bruning Ct., Fairfax, Va. 22032

Filed Nov. 25, 1981, Ser. No. 324,868

Int. Cl.[4] B28B *7/16, 7/28;* **E04G** *15/06*

U.S. Cl. 249—177 **8 Claims**



1. A form for use in forming a through passageway during the pouring of a concrete slab of a predetermined thickness in a building under construction for passing an elongated conduit of a predetermined size through the passageway formed as an arcuate passage gradually extending along and within the thickness of the slab and subsequently perpendicularly extending through the slab for positioning the elongated conduit axially extending along one face of the slab and projecting gradually into and subsequently through the thickness of the slab comprising:

an arcuate sleeve form having a minor end and a major end;

a curved wall structure joining said minor and major ends in a gradual arcuate passageway;

said arcuate sleeve form being in the general shape of a boot having a rounded heel end portion and a rounded and tapered toe end portion, the conduit initially passing into the major end of the arcuate passageway;

said curved wall structure enabling a gradual transition for the conduit initially axially extending along one face of the slab and subsequently fed upwardly therethrough by lengthwise movement for projecting perpendicularly through the slab for enabling conduits to be readily positioned through the concrete slabl without kinking of the conduit.

4,706,928

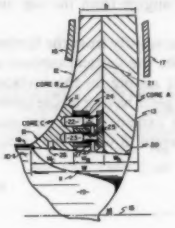
VANE CONE ASSEMBLY FOR USE IN MAKING CENTRIFUGAL ELASTOMERIC COATED IMPELLERS

John Hyll, Salt Lake City, Utah, assignor to Baker International Corporation, Houston, Tex.

Filed Jun. 10, 1985, Ser. No. 743,067

Int. Cl.[4] B29C *33/48;* **F04D** *29/22*

U.S. Cl. 249—184 **18 Claims**



1. A vane core assembly for forming an arc shaped vane passage between a pair of adjacent vanes in an injection-formed, elastomeric cover, closed, shroud impeller; said impeller having an inlet which communicates with said vane passages; wherein said vane passages have a peripheral arcual opening having a length substantially greater than its central arcual opening length; wherein a width of the central opening to said vane passage is substantially greater than the width of said vane passage's peripheral opening and wherein said central opening is transposed from a center line alignment with said peripheral openings, said vane core comprising a first core element, a second core element, and a third core element, said first core element and said second core element having planar mating surfaces which are substantially co-extensive and at least one third core member which detachably mates with a portion of a surface of said second core element which is opposed to the surface of said second core member which is in contact with said first core member; the third core being adjacent the central opening to the vane passage wherein said first core element and said second core element are dimensioned to extend substantially between said central opening to said peripheral opening within said vane passage; and wherein said third core element is dimensioned to have a length much shorter than a distance between said central opening and said peripheral opening whereby when said vane core assemby is positioned within said vane passage, said third core element being positioned within said central opening and extends into said vane passage but does not extend sufficiently to reach said peripheral opening; said first, second core elements being retractable from said vane passage along an arc shaped path defined by said passage, said third core element being detachably secured to said second core element by an attachment means configured to be accessible from said impeller inlet when said vane core assembly is positioned within said vane passage whereby said attachment means may be accessed and manipulated through said impeller inlet to effect a detachment

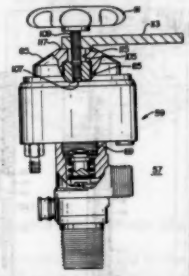
of said third core element from said second core element while said second and third core elements are within said vane passage and prior to a withdrawal of said second vane core element from said vane passage.

4,706,929

PNEUMATICALLY OPERATED VALVE WITH MANUAL OVERRIDE AND LOCKOUT

William S. Kalaskie, McMurray, and David E. Hughes, Pittsburgh, both of Pa., assignors to Stanley G. Flagg & Co., Inc., Washington, Pa.

Filed Dec. 8, 1986, Ser. No. 938,824
Int. Cl.[4] F16K *31/143*
U.S. Cl. 251—14 **11 Claims**



10. A manually operable pneumatic actuator for a gas cylinder valve having a valve body defining a valve chamber and a threaded bore forming with the valve chamber a shoulder, an inner valve stem slidable in the valve chamber between a valve open and a valve closed position, a first spring within the valve chamber biasing the inner valve stem to the open position, and a diaphragm member seated on said shoulder and forming a flexible gas seal for the valve chamber and inner stem, said actuator comprising:

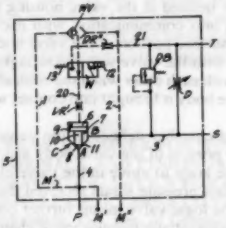
an actuator housing having a threaded nipple which threads into said threaded bore in the valve body to clamp said diaphragm member against said shoulder, said housing defining an actuator chamber aligned with the valve chamber, a piston slidable in said actuator chamber, an outer valve stem slidable in said nipple and bearing at one end against one side of said piston and at the other end against said flexible diaphragm member which contacts the inner valve stem, a boss extending from the other side of said piston, a set of disc springs stacked on said boss to bias the piston against the outer valve stem and thereby move the inner valve stem toward the closed position, the force generated on the inner valve stem by the disc springs being greater than the force applied by the first spring such that the inner valve stem is biased to the closed position, connector means for introducing pressurized pneumatic fluid into the actuator chamber on the first side of said piston to move the piston away from the outer valve stem such that the first spring moves the inner valve stem to the open position, and means for manually opening said valve comprising a threaded bore defined by said boss on the piston, an opening defined by the actuator housing in alignment with said threaded bore in said boss, a threaded shaft threaded into the threaded bore in said boss and extending out through said opening in the actuator housing, a handle on said threaded shaft, and a nut wrench threaded onto said threaded shaft and bearing against the actuator housing as said nut wrench is rotated while said threaded shaft is held stationary by said handle to draw the piston away from said outer valve stem against the bias of the disc springs such that the first spring moves the inner valve stem to the open position without pressurized pneumatic fluid.

4,706,930

VALVE ARRANGEMENT FOR USE WITH A HYDRAULIC ACCUMULATOR

Gerald Lexen, Johann Emmerstrasse 1,8000, München 50, Fed. Rep. of Germany

Filed Oct. 24, 1986, Ser. No. 922,747
Claims priority, application Fed. Rep. of Germany, Jan. 27, 1986, 3602362
Int. Cl.[4] F16K *31/124, 31/02*
U.S. Cl. 251—26 **11 Claims**



1. A valve arrangement for connection of a hydraulic pressure accumulator with a hydraulic machine and a reservoir tank, said valve arrangement comprising:

a leak-free shutoff valve having one port connected to a pressure accumulator and a second port connected to a hydraulic machine,

said shutoff valve including:

an actuator cylinder and an actuator piston slidably movable in leak-proof manner in said cylinder by a control pressure and a valve member on said piston pressed against a valve seat of said shutoff valve when the piston is acted upon by the control pressure,

a shuttle valve including control lines connecting the shuttle valve with each of the two ports of the shutoff valve and connecting the shuttle valve with a supply line for communicating said control pressure to said actuator cylinder, said shuttle valve including a displaceable valve member which moves in response to the control pressure at the two ports of said shuttle valve to connect said supply line with that one of the two ports which is at the higher control pressure than at said other port, and a leak-proof remote-controlled actuator valve in said supply line in one operative position for controlling the control pressure from said shuttle valve to said actuator piston for closing the shutoff valve , and

said remote-controlled valve being constructed to assume another operative position in which it interrupts and by passes the connection between the shuttle valve and the cylinder to allow the control pressure to exhaust through said remote-controlled valve which opens a relief connection between the cylinder and the tank.

4,706,931

Patent Not Issued For This Number

4,706,932

FLUID CONTROL VALVE APPARATUS

Kunihiko Yoshida, Ibaraki; Kenichi Koshi, Tsuchiura, and Nobuhiko Ichiki, Ibaraki, all of Japan, assignors to Hitachi Construction Machinery Co., Ltd., Tokyo, Japan

Filed Jul. 15, 1983, Ser. No. 514,274
Claims priority, application Japan, Jul. 16, 1982, 57-122902
Int. Cl.[4] F16K *31/12*
U.S. Cl. 251—31 **20 Claims**

1. A fluid control valve apparatus including:

logic valve means comprising:

a valve housing;

a first substantially circular valve chamber defined in the valve housing;

a valve body arranged in the first valve chamber for fluidtight movement in an axial direction, the valve body including opposite end portions and a conical surface portion;

a substantially circular valve seat adapted to be brought into fluidtight sealing contact with the conical surface portion of the valve body when the valve body moves in a valve closing direction;

a first hydraulic fluid chamber and a second hydraulic fluid chamber defined in the valve housing and adapted to be brought into communication with each other when the conical surface portion of the valve body is released from contact with the valve seat and brought out of communication with each other when the conical surface portion of the valve body is brought into contact with the valve seat; and

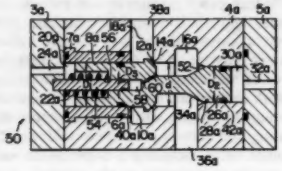
a first pilot chamber defined in the valve housing adjacent one end portion of the valve body and operative to force the valve body to move in the valve closing direction by a first pilot pressure signal received therein;

wherein the logic valve means further comprises:

a second substantially circular valve chamber defined in the valve housing;

a valve body extension formed by extending the other end portion of the valve body through the first hydraulic fluid chamber and arranged in the second valve chamber for fluidtight movement in an axial direction; and

a second pilot chamber defined in the valve housing adjacent an end of the valve body extension and operative to force



the valve body extension to move in a valve opening direction by a second pilot pressure signal received therein;

said first valve chamber, said second valve chamber and said valve seat being of such diameter that when the conical surface portion of the valve body is brought into contact with the valve seat to bring said first and second hydraulic fluid chambers out of communication with each other, the fluid pressures acting on the valve body in each of said first and second hydraulic fluid chambers are balanced so as to apply no net force in an axial direction of said valve body;

said first valve chamber being defined by an inner peripheral surface of a sleeve fitted in said valve housing, said one end portion of the valve body being disposed in said inner peripheral surface of the sleeve for sealing movement in an axial direction;

said conical surface portion of the valve body having a portion of the maximum diameter positioned in said second hydraulic fluid chamber, said sleeve having an outer diameter larger than a maximum diameter of the conical surface portion and an inner diameter less than the maximum diameter whereby the valve body can be inserted into and withdrawn out of the valve housing in an axial direction with the sleeve being removed therefrom upon assembly and disassembly of the valve means; and

wherein said valve body has a peripheral wall portion defining a pressure regulating chamber positioned between said opposite end portions, and a communicating duct formed therein and communicating said pressure regulating chamber with said first hydraulic fluid chamber, said second valve chamber having a diameter less than the diameter of the valve seat and said peripheral wall portion being configured such that a cross-sectional area thereof is substantially equal to a difference between the square of the diameter of the valve seat and a square of the diameter of the second valve chamber multiplied by π.

4,706,933

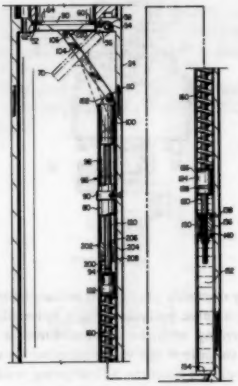
OIL AND GAS WELL SAFETY VALVE

Richard A. Sukup, 2524 Mockingbird Rd., Burleson, Tex. 76028, and Joseph Shoaf, 2341 Kings Country Dr., Irving, Tex. 70038

Filed Sep. 27, 1985, Ser. No. 780,793

Int. Cl.[4] F16K *1/20, 31/122, 47/08*

U.S. Cl. 251—54 **2 Claims**



1. An oil or gas well safety valve comprising:

a valve body having a valve seat therein,

a flapper valve,

hinge means for supporting said valve from said valve body, said hinge means being adjacent the valve seat and adjacent the wall of the valve body for movement from a closed position wherein said valve is seated against said seat and an open position wherein said valve is pivoted from said seat,

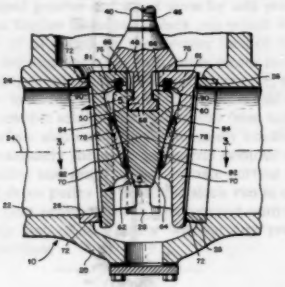
control means, positioned within said valve body and to side of said valve to which said valve opens, for engaging said valve at a point removed from said hinge means from selectively applying a force to said valve to pivot said valve between its closed and opened position, said control means comprising a cylinder having upper, intermediate and lower chambers, a control piston moveable in said upper chamber, a control link attached between said control piston and said valve for transmitting the movement of said control piston to said valve, a primary piston moveable in said intermediate chamber, said control and primary pistons connected by a rod therebetween, a compression spring positioned in the intermediate chamber below said primary piston for biasing said primary piston toward said valve, port means in said intermediate chamber above said primary piston whereby the introduction of fluid into said intermediate chamber causes said primary piston to move away from said valve, a shock absorber piston for movement in said lower chamber and connected for movement with said primary piston, said lower chamber being filled with a fluid and said shock absorber piston having an aperture therethrough communicating to either side thereof whereby the fluid in the lower chamber may move from one side of said piston to the other during movement thereof, said aperture being sized to control the movement of said shock absorber piston therein.

4,706,934

GATE VALVE

George W. Brown, Garden Grove, Calif., assignor to Mark Controls Corporation, Skokie, Ill.

Filed Aug. 22, 1986, Ser. No. 899,539
Int. Cl.[4] F16K *25/00*
U.S. Cl. 251—87 7 Claims



1. A gate valve comprising:

a body which defines a flow passage aligned with a flow axis;

a pair of spaced valve seats mounted to the body around the flow passage, each valve seat defining a seat face canted at a small angle with respect to a reference plane perpendicular to the flow axis;

a wedge having an end face and two spaced wedge faces rigidly positioned with respect to one another, said wedge faces converging in a first, valve closing direction and diverging in a reverse, valve opening direction;

means for moving the wedge transverse to the flow axis in the valve closing and valve opening directions;

first and second gates, each comprising a respective flange positioned to overlie the end face of the wedge and a respective convex thrust pad positioned to bear against a respective wedge face; and

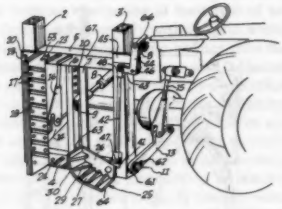
at least two springs, each mounted between the wedge and a respective one of the flanges to bias the flanges away from the wedge.

4,706,935

POST PULLER

Gregory L. Thompson, P.O. Box 266, Lowell, Fla. 32663

Filed Oct. 15, 1986, Ser. No. 918,900
Int. Cl.[4] E21B *19/00*
U.S. Cl. 254—29 R 5 Claims



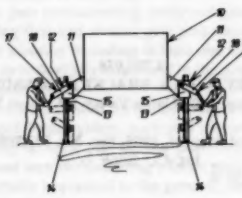
1. A machine for extracting an elongate work piece from a medium in which it is imbedded, said machine being adapted to be attached to and operated by a conventional three point hitch mechanism of a tractor, said three point hitch mechanism comprising a freely pivotable center link and two pivot links which may be operated in reciprocating vertical motion under power by lifting links, said machine comprising a substantially rigid frame, means for securing said frame to said three point hitch mechanism for reciprocating vertical motion in response to corresponding vertical motion of said pivot links, adjustable means for connecting said frame to said center link whereby said center link will remain substantially parallel to said pivot links and said frame will remain substantially vertical during vertical motion of said pivot links and said frame, means on said frame for engaging a work piece to be extracted, said means comprising a vertical gripping plate having gripping teeth for engaging the work piece, said vertical gripping and each of the gripping teeth on said gripping plate having a substantially flat top surface, and the included angle between the flat top surface of at least one of said teeth and said vertical flat front surface of said gripping plate being substantially less than ninety (90) degrees.

4,706,936

MANUAL CRANK ASSEMBLY FOR WINCHES, ESPECIALLY FOR RACK AND PINION JACKS OF A LIFTING AND DEPOSITING DEVICE FOR PORTABLE BOX-LIKE ARTICLES, E.G. LARGE CONTAINERS

Reinhold Riedl, Miltenberg, Fed. Rep. of Germany, assignor to Haacon Hebetechnik GmbH, Freudenberg/Main, Fed. Rep. of Germany

Filed Feb. 19, 1986, Ser. No. 830,749
Claims priority, application Fed. Rep. of Germany, Feb. 23, 1985, 3506422
Int. Cl.[4] B66F *7/12*
U.S. Cl. 254—89 R 15 Claims



1. Manual crank assembly for winches, especially for rack and pinion jacks of a lifting and depositing device for a portable box-like article, in which the rack and pinion jacks are connectable to the corners of the article and have spur racks provided on uprights thereof, each rack and pinion jack having gear means in engagement with the rack to enable it to be raised and lowered along its upright, characterized in that:

(a) the manual crank assembly has a haft-like crankcase, which at one end has a crankshaft rotatably mounted thereon and at the other end has a first drive shaft rotatably mounted thereon, said drive shaft having means for releasably connecting it to the gear means of the adjacent rack and pinion jack, and

(b) means operatively connecting the crankshaft with the drive shaft so that rotation of the crankshaft will cause rotation of the drive shaft, each jack having a winch housing and characterized in that the crankcase and each winch housing are provided with clutch means (**38**, **34**) to enable the crankcase to be connected to a winch housing in different work positions.

4,706,937

AUTOMOBILE COMPRESSOR-JACK DEVICE

Yo C. Chung, Chia I Hsien, Taiwan, assignor to Richard Lee, Taiwan

Filed Jul. 10, 1986, Ser. No. 884,100
Int. Cl.[4] B66F *3/24*
U.S. Cl. 254—93 H 7 Claims

1. An automobile compressor-jack device comprising a

motor, a transmission mechanism, a piston-driven compressor, and a piston-driven jack;

said transmission mechanism comprising a reduction gear which is coupled to and rotated by said motor, said reduction gear coupled to and driving a transmission wheel, said

transmission wheel driving an elongated pin eccentrically mounted thereon;

said eccentrically mounted pin coupled to and simultaneously driving both a piston rod of said compressor and a piston rod of said jack upon rotation of said reduction gear.

4,706,938

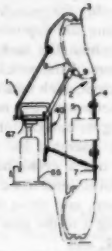
OFFSET WHEEL BRACKET ASSEMBLY

Michael C. Young, 1407 Union Valley Rd., West Milford, N.J. 07480

Filed May 14, 1985, Ser. No. 733,908

Int. Cl.[4] B66F *7/10*

U.S. Cl. 254—133 R **12 Claims**



1. A vehicle wheel offset wheel bracket assembly for use with a jack comprising a platform having upper and lower surfaces, and two flanges parallel to one another along opposite parallel edges of said platform and projecting above said upper surface of the platform, said lower surface having means for receiving an upper end of a jack, wheel rim engaging means comprising a pair of arms spaced from one another and pivotally mounted on said flanges, said arms having free outer ends to engage a wheel rim above said platform, stop means for limiting movement of the outer end of said arms toward one another to a position at which said arms diverge from one another above said platform in the direction of said wheel, and restraining means carried by said platform and depending below said platform, said restraining means including hook means for engaging a wheel web below said platform.

4,706,939

FIRE HYDRANT HOIST

Claude Gagne, 667 rue Norvége, Apt. 5, Sainte-Foy, Quebec, Canada G1X 3G5

Filed Aug. 5, 1986, Ser. No. 893,360

Int. Cl.[4] B66D *1/04, 1/36*

U.S. Cl. 254—332 **6 Claims**

1. A hoist for hoisting a fire hydrant head off its underlying upright feeding pipe, the latter having a top coupling flange, said hoist comprising a post, a lateral arm carried by the top of said post, fire hydrant hoisting means carried by said post and arm and a base for supporting said post in upright position, said base including a generally semi-circular collar for partly surrounding the peripheral face of said feeding pipe top coupling flange, clamping means to removably clamp said collar in operative position on said top coupling flange, said collar having inwardly-extending upper and lower flanges for overlying and underlying said top coupling flange, said collar having a lateral extension, said post upstanding from said lateral extension to clear said hydrant head, and means to rotate said arm about the axis of said post.

4,706,940

ROPE HOIST APPARATUS

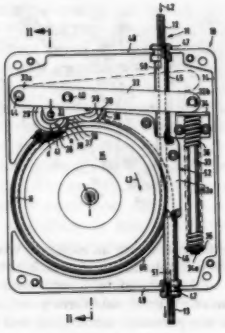
Manfred Harig, Bergish Gladbach, Fed. Rep. of Germany, assignor to Greifzug Hebezeugbau GmbH, Fed. Rep. of Germany

Filed Mar. 14, 1986, Ser. No. 839,726

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1985, 3509920

Int. Cl.[4] B66D *1/00, 1/30*

U.S. Cl. 254—333 **10 Claims**



1. A rope hoist apparatus comprising a housing, a drive

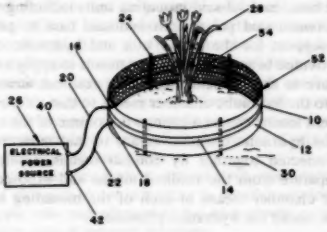
pulley rotatably supported in said housing and having a central plane with a peripheral V-shaped groove, said drive pulley also including a cylindrical running face adjacent the groove, a roller support mounted in said housing for movement in the plane of the drive pulley, at least two pressure rollers rotatably supported in said roller support for movement toward and away from an innermost portion of said V-shaped groove, a rope wrapped around said drive pulley and having a load run in said V-shaped groove and acted upon by said pressure rollers, said rope further including a slack run which is received for a portion of its length on the running face of the pulley, guide means for said slack run, said guide means including an entry end disposed adjacent to said pulley groove, said guide means further including a ramp surface adjacent said entry end and inclined relative said central plane away from said groove, said ramp surface also including an arcuately contoured portion of approximately the same peripheral contour as that of said drive pulley, said ramp surface arcuate portion cooperating with said drive pulley to guide the slack run in order that the slack run pass easily out of the groove and onto the cylindrical running face of the pulley without any pronounced bending of the rope.

4,706,941

SNAIL AND SLUG ELECTRICAL BARRIER

Thomas L. Sherdan, 18161 Daves Ave., Monte Sereno, Calif. 95030

Filed Sep. 12, 1986, Ser. No. 906,448
Int. Cl.[4] A01K *3/00*
U.S. Cl. 256—10 **12 Claims**



1. An electrical barrier for restricting the movement of snails, slugs and similar gastropod mollusks comprising:

(a) A plurality of longitudinal conductive surfaces with each one of said conductive surfaces being of sufficient width so that the sum of the widths of all of said plurality of longitudinal conductive surfaces presents a distance sufficiently wide to insure that the largest snail or slug cannot step over the said plurality of longitudinal conductive surfaces without contacting at least two of said conductive surfaces simultaneously with the said width of each of said conductive surfaces being greater than the thickness of the said conductive surfaces, with adjacent said conductive surfaces being separated by a electrically insulating gap the width of said electrically insulating gap being of minimal size so that the smallest snails or slugs traversing said conductive surfaces is forced to contact at least two of said conductive surfaces simultaneously,

(b) A terminal means for connecting an electrical power source to said conductive surfaces that provides an electrical potential difference between each adjacent said conductive surface whereby any snail, slug or similar creature of any size traversing said conductive surfaces will receive an electrical shock when contacting two or more of said conductive surfaces simultaneously,

(c) A mounting means to which the said conductive surfaces are affixed in the said sequence and that maintains the said electrically insulating gap with said mounting means being of sufficient strength and rigidity to make the mounted assembly capable of functioning as said electrical barrier in a vertical or horizontal position.

4,706,942

PADDOCK FENCE LAYOUT WITH CONCRETE FOOTINGS

Edward S. Robbins, Jr., Florence, Ala., assignor to Centaur Fencing Systems, Inc., Muscle Shoals, Ala.

Filed Aug. 1, 1986, Ser. No. 892,042
Int. Cl.[4] B21F *27/00*
U.S. Cl. 256—35 **33 Claims**

1. A fence system comprising:

at least one gate post assembly, each said gate post assembly comprising first and second gate post members, each said gate post member including at least one fence post means, adapted to be partially implanted in the ground, and a gate post support means;

at least one corner post assembly defining at least one corner area in said fence system, each said corner post assembly comprising at least one corner post member, each said corner post member including a fence post means, adapted to be partially implanted in the ground, and a foot portion coupled to said fence post means;

at least one elongated length of fencing material of the type including platic encased high tensile wires or fibers, each of said at least one length of fencing material being coupled at each end thereof to a first and second gate post member, respectively, and being slidably coupled to at least one of said at least one corner post members;

at least one tensioning means for tensioning each of said at least one length of fencing material, provided on each of said at least one length of fencing material, so that

the fencing material may be tensioned between the coupled ends thereof; and

wherein the foot portion of each said corner post member includes an extension that is adapted to project substantially radially away from adjacent fencing material, to thereby maintain its respective fence post means in a substantially upright disposition against the force exerted thereon by the tensioned fencing material.

4,706,943

CONNECTION DEVICE FOR PLASMA GENERATORS

Gunnar Astner, and Sten-Ove Sjöström, both of Hofors, Sweden, assignors to SKF Steel Engineering AB, Hofors, Sweden

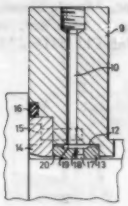
Filed Nov. 12, 1985, Ser. No. 797,077
Claims priority, application Sweden, Dec. 3, 1984, 8406089
Int. Cl.[4] F27D *11/08*
U.S. Cl. 266—265 **8 Claims**

1. A device for facilitating the connection of a burner to a reaction tuyere in a furnace with simultaneous sealing of the furnace by means of a protective gas during connection, comprising:

a circular flange capable of being mounted in a wall of said furnace and having an inner and outer circumference;

a seat provided on the inner circumference of said flange;

a sealing ring mounted in said seat and being radially movable in said seat to form an annular chamber on the inner circumference of said flange, said sealing ring having an



inner and outer circumference and a groove provided on the inner circumference thereof which communicates with said annular chamber; and

a channel provided in said flange and communicating with said annular chamber for supplying said protective gas thereto.

4,706,944

STOPPER FOR USE IN MOLTEN METAL HANDLING

Stephen J. Lee, Clydebank, Scotland, assignor to Thor Ceramics Limited, Clydebank, Scotland

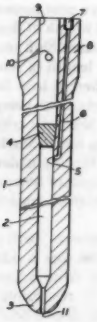
PCT No. PCT/GB85/00188, § 371 Date Feb. 10, 1986, § 102(e) Date Feb. 10, 1986, PCT Pub. No. WO85/05056, PCT Pub. Date Nov. 21, 1985

PCT Filed May 7, 1985, Ser. No. 827,931

Claims priority, application United Kingdom, May 5, 1984, 8411596

Int. Cl.[4] C21C *5/48*

U.S. Cl. 266—272 **10 Claims**



1. In a stopper comprising a monoblock refractory body having a gas duct extending longitudinally within the body of the stopper from one end in the opposite end, the said duct providing at said one end a means of injecting gas through an aperture in the nose of the stopper and at said opposite end means for receiving a stopper support member, the improvement comprising (a) the provision of a solid gas-tight plug within the duct to seal the duct at an intermediate level within the body of the stopper to thereby form a shortened gas duct at said one end and a socket at said opposite end for receiving the stopper support means, and (b) the provision of an integral narrow gas supply channel communicating with the shortened duct between the seal and the nose and extending from said shortened duct through the body of the stopper to a gas supply inlet provided at said opposite end.

4,706,945

HYDRAULIC MOUNTING SYSTEM FOR A POWER UNIT

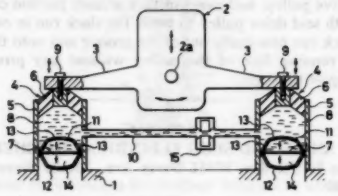
Kenichi Watanabe, and Haruyuki Taniguchi, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Dec. 10, 1985, Ser. No. 807,227

Claims priority, application Japan, Dec. 19, 1984, 59-268846; Dec. 19, 1984, 59-268847; Dec. 19, 1984, 59-268849; Dec. 19, 1984, 59-268851; Mar. 30, 1985, 60-68306

Int. Cl.[4] F16F *3/00*

U.S. Cl. 267—186 **19 Claims**



1. A mounting system for a power unit having an output shaft, the mounting means comprising mounting units located at opposite sides of the output shaft for supporting the power unit on a base, each of said mounting units including resilient means between said power unit and said base to provide a resilient support for the power unit and hydraulic chamber means provided beneath the resilient means to apply a hydraulic pressure to the resilient means, the resilient means being exposed to the hydraulic chamber means so that a deflection of the resilient means causes a change in volume of the chamber means, the hydraulic chamber means in said mounting units being connected together by conduit means, resilient wall means separate from the resilient means and exposed to the hydraulic chamber means in each of the mounting units for deflection under the hydraulic pressure.

4,706,946

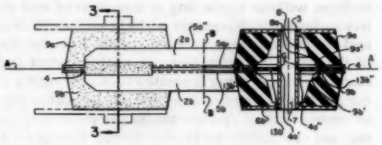
MOTION CONTROL STRUT

Richard P. Thorn, and Leonard J. Schwemmer, both of Lord Corporation, 1635 W. 12th St., Erie, Pa. 16512

Filed Nov. 25, 1985, Ser. No. 801,232

Int. Cl.[4] F16F *7/00, 1/36;* B60G *11/22;* F16M *13/00*

U.S. Cl. 267—292 **7 Claims**



4. A friction damped motion control strut, comprising:

a pair of elongate plates extending in parallel relation on an elongate axis and adapted to be operatively coupled at opposite ends to spaced structures;

friction means engaged between said plates and movable relative thereto adjacent at least one of said ends;

edge means spaced apart on said plates along said axis and friction means and defining aligned apertures therein;

attachment means having a portion extending transversely through said aligned apertures and adapted to fasten said strut to said spaced structures;

said attachment means including elastomeric means providing an elastic shear connection between said plates and said attachment means portion for enabling said attachment means portion to undergo substantially free resilient displacement through a limited axial extent relative to said plates along said axis;

said edge means in said plates and said friction means cooperating with said attachment means portion to define therebetween gaps permitting said resilient displacement on said axis until said limited extent of motion has been reached, whereupon the attachment means portion engages the edge means in said friction means and displaces the friction means relative to the plates for causing a motion damping action to occur within the strut,

wherein said edge means incudes a pair of edges disposed transverse to said axis on opposite sides of said attachment means portion with the pair of edges on said friction means being located closer together on said axis than the pair of edges on said plates so that when said attachment means reaches said limit of motion it engages said friction means and displaces it toward said plate edges; and

wherein said elastomeric means includes a pair of elastomeric blocks extending transversely outward of said plates in opposite directions, and said attachment means includes a pair of washers engaging said blocks outboard of said plates and a connecting member extending through said aligned apertures for compressing said elastomeric blocks between said washers and said plates and thereby affecting the magnitude of the friction force generated between the friction means and the plates; and

including snubbing surfaces means on said elastomeric blocks normally confronting said connecting member in spaced relation and engageable with said connecting member after it has displaced the friction means through predetermined extent to effect a snubbing action between said attachment means and said plates wherein said snubbing surface means converges toward each washer from said plate edges and has an intermediate protrusion adapted to engage said connecting member in response to said predetermined extent of displacement of said friction means relative to said plates.

6. A friction damper motion control strut, comprising:

a pair of elongate plates extending in parallel relation on an elongate axis and adapted to be operatively coupled at opposite ends to spaced structures;

friction means engaged between said plates and movable relative thereto adjacent at least one of said ends;

edge means spaced apart on said plates along said axis and friction means and defining aligned apertures therein;

attachment means having a portion extending transversely through said aligned apertures and adapted to fasten said strut to said spaced structures;

said attachment means including elastomeric means providing an elastic shear connection between said plates and said attachment means portion for enabling said attachment means portion to undergo substantially free resilient displacement through a limited axial extent relative to said plates along said axis;

said edge means in said plates and said friction means cooperating with said attachment means portion to define therebetween gaps permitting said resilient displacement on said axis until said limited extent of motion has been reached, whereupon the attachment means portion engages the edge means in said friction means and displaces the friction means relative to the plates for causing a motion damping action to occur within the strut;

wherein said friction means includes a first friction element displaceable through a first axial extent to provide a first friction force and a second friction element displaceable through a second axial extent beyond said first axial extent to provide a second friction force greater than the first; and

an element having a planar portion engaged between said plates to provide said first friction element and an enlarged portion adjacent thereto cooperable with said plates to provide said second friction element.

4,706,947

VIBRATION PREVENTING DEVICE

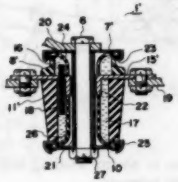
Katsunori Makibayashi, Toyota; Kenji Murase, Suzuka, and Motoo Kunihiro, Tsu, all of Japan, assignors to Toyo Tire & Rubber Co., Ltd. and Toyota Jidosha Kabushiki Kaisha, both of, Japan

Filed Jul. 3, 1986, Ser. No. 882,141

Claims priority, application Japan, Jul. 5, 1985, 60-146578

Int. Cl.[4] F16F *13/00*

U.S. Cl. 267—140.1 **16 Claims**



1. A vibration-preventing device comprising:

an inner cylinder;

an upper plate;

a lower plate;

a partition wall positioned outside said inner cylinder and interposed between said upper plate and said lower plate, said upper plate and said lower plate being connected to said inner cylinder;

an upper vibration-preventing rubber member interposed between said partition wall and said upper plate;

an upper elastic film disposed between said cylinder and said upper vibration-preventing rubber member;

an upper damper liquid chamber being defined by said upper vibration-preventing rubber member and said upper elastic film;

a lower vibration-preventing rubber member interposed between the partition wall and the lower plate;

a lower elastic film disposed between said cylinder and said lower vibration-preventing rubber member;

a lower damper liquid chamber being defined by said lower vibration-preventing rubber member and said lower elastic film; and

an orifice extending through said partition wall, said upper damper liquid chamber communicating with said lower damper liquid chamber through said orifice;

wherein said partition wall separates said upper elastic film completely from said lower elastic film, and said partition wall further separates said upper damper liquid chamber from said lower damper liquid chamber.

4,706,948

CENTERING AND CLAMPING APPARATUS FOR ELONGATE ROUND BODIES OF VARIOUS DIAMETER

Harro Kroecher, Bad Kreuznach, Fed. Rep. of Germany, assignor to Hombak Maschinenfabrik GmbH & Co. KG, Bad Kreuznach, Fed. Rep. of Germany

Filed Oct. 3, 1986, Ser. No. 915,111

Claims priority, application Fed. Rep. of Germany, Oct. 5, 1985, 3535616

Int. Cl.[4] B25B *1/04*

U.S. Cl. 269—34 **11 Claims**

1. The centering and clamping apparatus for the automatic centering of elongated round bodies, such as round timbers, with the centering axis of processing machines, said apparatus having a plane of symmetry and comprising:

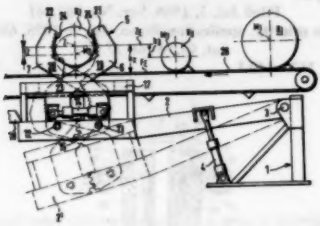
(a) chuck arms which cross to form a scissors-like structure;

(b) means for pivotally mounting said chuck arms at the

bottom thereof, and means for synchronously pivoting said arms for clamping and releasing of such round body;

(c) each chuck arm including a collet jaw comprised of a lower slide element and an upper grip element having an effective flank, each flank being concavely curved to permit the flank to engage and clamp the circumference of the round body at bearing points; and

(d) means for raising and lowering said mounting means for



said chuck arms to permit loading and unloading of the round body, and wherein

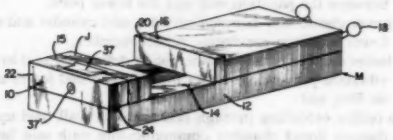
(e) the concave shape of the effective flanks have such a defined curvature that the grip elements of said chuck arms engage the circumference of the round body at the instant when said round body is moved upwardly along said slide elements until the longitudinal axis of said body coincides with the centering axis of said processing machine.

4,706,949

VISE JAW SUPPORT SYSTEM AND INTERCHANGEABLE VISE JAWS THEREFOR

Robert L. Dossey, 1975 S. Zuni, Denver, Colo. 80223, and Truman J. Collins, 6231 Federal Blvd. #3, Denver, Colo. 80221

Filed Dec. 17, 1985, Ser. No. 810,873
Int. Cl.[4] B25B *1/24*
U.S. Cl. 269—283 **20 Claims**



1. In a machine vise unit having a vise jaw support bit, the improvement comprising:

first and second jaws mounted on said vise jaw support bed in facing relation to one another, each of said jaws being elongated in a direction transversely of said bed, said second jaw slidably mounted on said bed for movement toward and away from said first jaw, means for mounting said first jaw in fixed relation to one end of said bed including an elongated adaptor block having a key member mounted on one of said adaptor block and said bed and extending through a keyway in the other of said adaptor block and said bed in a direction parallel to the length of said adaptor block and normal to the length of said bed; and

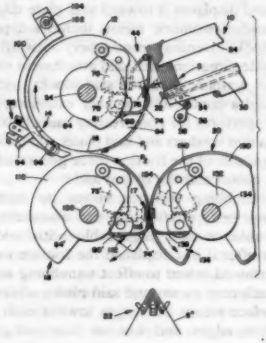
mounting means between said first jaw and said adaptor block including an interfitting complementary rib and groove for fixedly mounting said first jaw to said adaptor block with a workpiece-engaging surface on said first jaw disposed in facing relation to said second jaw, said mounting means between said adaptor block and said first jaw defined by a vertically extending dovetail groove in said first jaw, a mounting block insert in a groove in said adaptor block, said insert having a dovetail end portion projecting away from said adaptor block complementary to said dovetail groove in said first jaw, and adjustable connecting means between said mounting block insert and said adaptor block operative to slide said dovetail end portion towards the groove in said adaptor block to draw said first jaw into clamping engagement with said adaptor block when said dovetail end portion is mounted in said dovetail groove such that said first jaw is advanced into flush abutting relation to said adaptor block.

4,706,950

SHEET GATHERING APPARATUS

Rudolph H. Ruetschle, Avon Lake, and Keith S. Macey, Rocky River, both of Ohio, assignors to K. S. Macey Machine Company, Inc., Cleveland, Ohio

Filed Jan. 6, 1986, Ser. No. 816,458
Int. Cl.[4] B65H *39/02*
U.S. Cl. 270—54 **8 Claims**



1. An apparatus for gathering signatures of the type having a folded back and two front edge portions opposite the back, comprising:

(a) hopper means for holding a supply signatures at a first location;

(b) rotatable transfer drum means positioned horizontally adjacent said location for extracting a signature from said supply of signatures and carrying the signature in a first path about the periphery of said transfer drum means;

(c) a stop means for limiting the movement of the signature along said first path to cause the signature to be stopped with its front edge portions at a predetermined location subjacent the transfer drum means;

(d) a first spreader drum means mounted for rotation subjacent said transfer drum means with its axis of rotation extending parallel to the axis of rotation of said transfer drum means and its outer peripheral surface nearly tangential to the outer peripheral surface of said transfer drum means substantially at said predetermined location;

(e) gripper means carried by said spreader drum means for engaging the front edge portions of a signature engaged with said stop means and conveying said signature away from said stop means and said transfer drum means along a second path about the periphery of said first spreader drum means;

(f) a second spreader drum means having an outer diameter substantially equal to the outer peripheral diameter of said first spreader drum means and mounted along said second path adjacent said first spreader drum means and rotatable about an axis parallel to the axis of rotation of said first spreader drum means in a plane generally perpendicular to the plane which includes the axes of rotation of said transfer drum means and said first spreader drum means to

define a nip between said first spreader drum means and said second spreader drum means;

(g) gripper means carried by said second spreader drum means for gripping a front edge portion of a signature on the side of said signature outwardly of said first spreader drum means as said signature passes through said nip and pulling the side thus gripped away from the side engaged with said first spreader drum means; and,

(h) said outer peripheral surfaces of said transfer drum means and said first spreader drum means are each located at generally the same radial distance from their respective axis of rotation.

4,706,951

APPARATUS FOR COLLATING DIFFERENTIATED PRINTED PRODUCTS

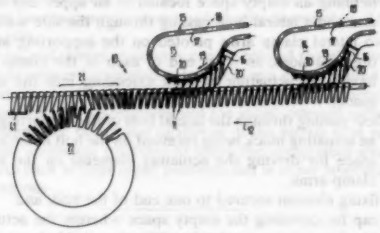
Willey Leu, Pfäffikon, Switzerland, assignor to Ferag AG, Hinwil, Switzerland

Filed Sep. 22, 1986, Ser. No. 910,386

Claims priority, application Switzerland, Sep. 27, 1985, 04202/85

Int. Cl.[4] B65H *5/30*

U.S. Cl. 270—55 **7 Claims**



1. An apparatus for collating differentiated printed products, comprising:

a plurality of mutually and substantially uniformly spaced hoppers;

said hoppers being transported along a path of conveyance in a predetermined direction of conveyance;

each of said hoppers having a loading opening and being loadable from above;

each hopper being bounded by at least two walls which extend substantially transverse to the predetermined direction of conveyance of said hoppers along said path of conveyance;

at least one product infeed conveyor for individually infeeding the printed products into said hoppers;

said at least one product infeed conveyor being provided with a plurality of mutually spaced controllable clamps located above said hoppers and having substantially the same mutual spacing from one another as said mutually and substantially uniformly spaced hoppers and said plurality of mutually spaced controllable clamps revolving substantially synchronously with said hoppers;

said at least one product infeed conveyor having a product transfer region;

said plurality of mutually spaced controllable clamps transporting the printed products in a suspended manner at least in said product transfer region of said at least one product infeed conveyor such that the printed products have a lower free edge;

said product transfer region of said at least one product infeed conveyor being inclined to said path of conveyance of said hoppers;

guide means provided for said product transfer region; and

said guide means guiding said lower free edge of each printed product into said loading opening of a momentarily related one of said hoppers.

4,706,952

RECREATIONAL SWING SET SEAT

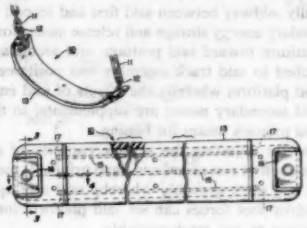
William H. Shanson, Mentone, and Wesley D. Sutton, Jr., Fort Payne, both of Ala., assignors to Game Time, Inc., Fort Payne, Ala.

Division of Ser. No. 525,872, Aug. 24, 1983, Pat. No. 4,524,966. This application Apr. 25, 1985, Ser. No. 727,223

The portion of the term of this patent subsequent to Jun. 25, 2002, has been disclaimed.

Int. Cl.[4] A63G *9/00*

U.S. Cl. 272—85 **14 Claims**



1. A seat suitable for use with a recreational swing set comprising:

a body of flexible material,

an elongated insert embedded in said body, said insert comprising a flat elongated band,

a plurality of stands of flexible material embedded in said body of flexible material, said strands being laterally spaced form one another and being disposed generally longitudinally relative to said elongated insert, and each of said strands having opposite spaced strand end portions, the width of each of said strands being less than the width of said band and said band overlapping a substantial portion of each of said strands,

a securing means positioned at said strand end portions for securing said strand end portions to said insert, and

a connecting means disposed at end portions of said body of flexible material for connecting said end portions to a pair of depending members of a recreational swing set.

4,706,953

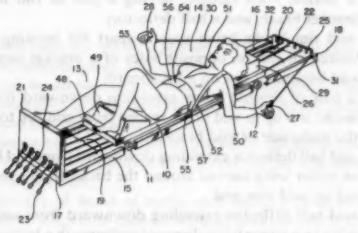
ACTIVE/PASSIVE EXERCISE APPARATUS

Gary A. Graham, P.O. Box 2000, Glacier, Wash. 98244

Continuation-in-part of Ser. No. 786,540, Oct. 11, 1985, abandoned, which is a continuation-in-part of Ser. No. 696,254, Jan. 29, 1985, abandoned. This application Jan. 7, 1987, Ser. No. 1,192

Int. Cl.[4] A63B *21/02*

U.S. Cl. 272—120 **3 Claims**



1. An exercise apparatus comprising:

a track assembly having a first end and a second end, and further comprising:

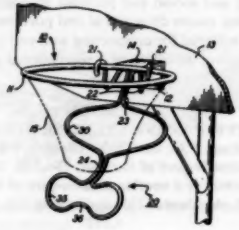
a first track,
a second track,
means for interconnecting said first and second tracks whereby said tracks are positioned parallel to each other,
a platform for supporting a user in the supine position, said platform having a head end, a foot end and sides,
means for attaching said platform to said track assembly whereby said platform is free to move between said first and second ends,
primary energy storage and release means for biasing said platform toward a position on said track assembly essentially midway between said first and second ends,
secondary energy storage and release means for biasing said platform toward said position, said secondary means attached to said track assembly and positioned to engage said platform whereby the effects of said engagement of said secondary means are supplemental to the effects of said primary means for biasing,
means for adjusting the storage capacity of said primary means, foot rest means and hand grippable means attached to said track assembly whereby said user applying hand and/or foot forces can set said platform into oscillating motion on said track assembly.

4,706,954

BASKETBALL RETURN DEVICE

Thomas R. Kershaw, 2086 Carter Rd., Geneva, N.Y. 14456

Filed Aug. 28, 1986, Ser. No. 901,121
Int. Cl.[4] A63B *69/00*
U.S. Cl. 273—1.5 A **34 Claims**



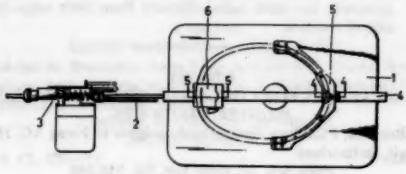
1. A basketball return device comprising:
a. a flexible resin element having a pair of rim hooks, a bracket brace, and a ball deflector;
b. said rim hooks being spaced apart for hooking over a basketball rim on opposite sides of a bracket supporting said basketball rim on a backboard;
c. a pair of flexible loops extending downward from said hooks and up to said brace spaced from said rim to engage the underside of said bracket;
d. said ball deflector extending downward from said brace to an upper wing curved around the backside of a net hanging on said rim; and
e. said ball deflector extending downward from said upper wing to a lower wing disposed underneath a bottom opening of said net, said upper and lower wings being flexibly disposed to be engaged by basketballs passing through said rim for resiliently returning said basketballs back toward their shooters.

4,706,955

RACKET FRAME CLAMP FOR STRINGING MACHINE

Sumiaty Ngadi, 130, 192 Lane, Sec 1, Fung Hsing Rd, Tan Tzu, and David T. Chu, 150, Chung Chen Rd., both of Taichung, Taiwan

Filed May 20, 1986, Ser. No. 865,134
Int. Cl.[4] A63B *51/14*
U.S. Cl. 273—73 A **4 Claims**



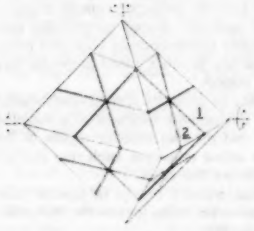
1. A lateral clamp head of a racket stringing machine comprising:
a vertically extending supporting arm having side walls defining an empty space located at an upper end of the arm and a lateral hole passing through the side walls;
two lateral clamp arms pivoted on the supporting arm at opposite sides, an inner end of each of the clamp arms having an actuating element extending into the empty space;
a bolt passing through the lateral hole of the supporting arm, an actuating block being received on the bolt in the empty space for driving the actuating elements on the lateral clamp arms;
a fixing element secured to one end of the bolt; and
a cap for covering the empty space wherein the actuating block comprises a stub tube with a threaded hole receiving the bolt, and a plate fixed thereon, slender holes being provided in the plate.

4,706,956

REGULAR POLYHEDRON PUZZLES

Ibrahim K. Abu-Shumays, and Mary D. Abu-Shumays, both of 1248 Varner Rd., Pittsburgh, Pa. 15227

Continuation-in-part of Ser. No. 839,368, Mar. 14, 1986, Pat. No. 4,674,750, which is a continuation-in-part of Ser. No. 687,141, Dec. 28, 1984, abandoned, which is a continuation-in-part of Ser. No. 604,941, Apr. 27, 1984, abandoned, which is a continuation-in-part of Ser. No. 394,869, Jul. 2, 1982, Pat. No. 4,593,907. This application Oct. 23, 1986, Ser. No. 922,479
Int. Cl.[4] A63F *9/08*
U.S. Cl. 273—153 S **10 Claims**



1. In a geometrical puzzle comprised of a core central part and at least 18 component structures stacked together to form a regular polyhedron structure; said regular polyhedron struc-

ture having M edges, N vertices (corner points), and at least eight external plane faces;

each of M of said component structures is an edge structure having two exposed plane faces which meet along an edge of said regular polyhedron structure; each of N of said component structures is a corner structure having one vertex which coincides with a vertex of said regular polyhedron structure; the number of corner structures is the same as the number N of vertices of said regular polyhedron structure, the number of edge structures is the same as the number M of edges of said regular polyhedron structure;

each of the N corner structures is associated with a rod axis (pivot) and is joined to and is allowed to freely rotate in place around said rod axis (pivot); said rod axis (pivot) is one of N similar rod axes (pivots) emanating from the center of said puzzle and forming the core central part of said puzzle; each of said rod axes if fixed in position relative to the other rod axes and lies around a straight line which joins a vertex of said regular polyhedron structure and the geometric center of the puzzle;

each of the N corner structure is restricted to rotate in place, each of the remaining structures is a free component structure and has a knob which fits in a groove formed between other component structures and said core central part; said knob serves to prevent undesirable disassembly of the puzzle;

each of said corner structures can be rotated together with all its adjacent component structures as a group around its associated rod axis; rotations of component structures alter the relative positions and the initial external surface designs; the object and challenge of the puzzle is to perform additional rotations to move the component structures back to their initial positions and to other interesting positions.

4,706,957

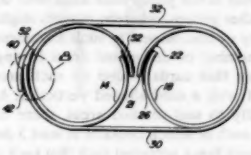
LEG MOVEMENT RESTRAINING DEVICE FOR TRAINING ATHLETES

Charleston W. Jackson, 2214 W. Heatherbrae #2, Phoenix, Ariz. 85015

Filed May 16, 1986, Ser. No. 863,723

Int. Cl.[4] A63B *69/36*

U.S. Cl. 273—188 R **7 Claims**



1. A training aid for teaching a predetermined physical motion comprising:

(a) a first leg-engaging member having a first band adapted to encircle a first knee of the user, said first band having cooperating closures for securing said band about the first knee area of the user and further including straps oppositely extending from said band, said straps having first fastener members associated therewith; and

(b) a second leg-engaging member having a second band adapted to encircle the second knee of the user, said second band having with cooperating closures for securing said band about the second knee area of the user, said second leg-engaging member having a second fastener member associated therewith for attachment of said straps thereto in a use position with the straps extending between the leg-engaging members both at the front and the rear of the knees of the user, whereby controlled forward and rearward movement of the user's legs is permitted and side motion is restrained.

4,706,958

GOLF BALL

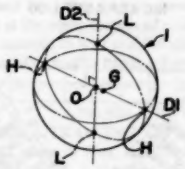
Shunsaku Inoue, 12-16, Asahigaoka 2-chome, Ikeda-shi, Osaka-fu, Japan

Filed Dec. 5, 1985, Ser. No. 804,941

Claims priority, application Japan, Apr. 19, 1985, 60-59446[U]

Int. Cl.[4] A63B *43/00, 45/02*

U.S. Cl. 273—213 **6 Claims**



4. A golf ball characterized in that its center of gravity and geometrical center are not coincident and the surface thereof is marked with a linear mark identifying the location of a first straight line passing through the center of gravity and the geometrical center of the ball, said mark set on at least one lead point, said lead point being one of two points on said surface at locations at which a second straight line perpendicular to said first straight line intersects said surface.

4,706,959

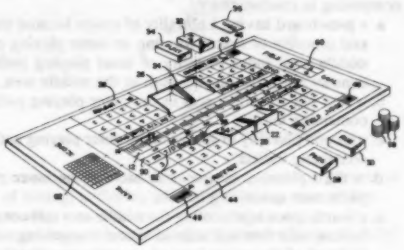
QUARTERBACK DRAW FOOTBALL

Frank O. Price, 1712 N. Dinwiddie St., Arlington, Va. 22207

Filed Apr. 10, 1986, Ser. No. 850,040

Int. Cl.[4] A63F *3/00*

U.S. Cl. 273—247 **5 Claims**



1. A board game for use by a plurality of players for playing a simulated football game, comprising:

(a) a game board having first indicia located thereon that is representative of a football field, said first indicia including yard line and goal line indicia;

(b) a playing piece adapted to be placed on the game board for indicating the position of a player on the representative football field;

(c) a plurality of decks of cards, each deck of cards being related to a specific type of football play and each card having second indicia thereon indicating the result of a selected football play such that a player selects a particular type of football play, draws a card from the deck associated with the selected play and follows the directions set forth by the second indicia on the card;

(d) said game board having third indicia located thereon representing betting areas, said betting areas including outcomes of a football play or series of football plays; and

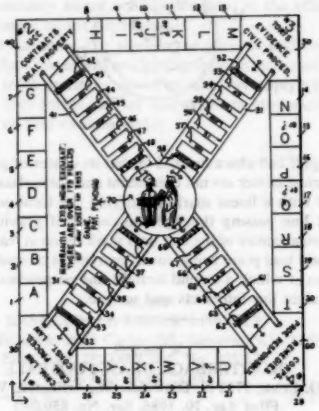
(e) said game also including means for indicating that a player has placed a bet in the betting area whereby a player can place a bet on a particular outcome of a football play or series of football plays that be believes will occur.

4,706,960

FIELDS OF LAW AND LEGAL PROCESS CARD AND BOARD GAME APPARATUS

Robert S. Nowacki, and K. Kristine Nowacki, both of 429 Tallow Tree Dr., Pensacola, Fla. 32506

Filed Nov. 18, 1985, Ser. No. 798,859
Int. Cl.[4] A63F *3/00*
U.S. Cl. 273—257 **4 Claims**



1. A legal educational game apparatus to teach, test, entertain, allow chance, choice and competition and expose law comprising in combination:

a. a gameboard having a plurality of spaces located thereon, said plurality of spaces forming an outer playing path, a middle area and a plurality of inner playing paths that connect the outer playing path to the middle area,

b. a first plurality of spaces in the outer playing path each containing indicia,

c. a second plurality of spaces in the outer playing path each containing indicia,

d. a third plurality of spaces in each of the inner playing paths each containing indicia,

e. a fourth space representing the middle area and containing indicia, said first and second spaces comprising substantially all of the spaces located on said outer playing path, the indicia on each first and second space being different from the indicia on all other first and second spaces,

f. a plurality of sets of cards, each card having identifying indicia thereon and each set being comprised of cards having the same identifying indicia thereon, the identifying indicia on the cards in one set being different from the identifying indicia on the cards in all other sets and the identifying indicia on the cards corresponding to the indicia on said first and second spaces, such that the indicia on each one of said first and second spaces corresponds to a different category of legal topics, the different categories of legal topics being represented by the various sets of cards, each of said cards also having response soliciting indicia thereon, whereby players attempt to give the correct response to the indicia presented on the cards,

g. a rectangular card box designed for holding said plurality of sets of cards aligned next to one another in continuous rows,

h. a chance means for each player at his respective turn to develop by chance or choice an identifying factor,

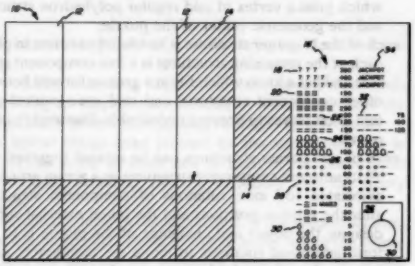
i. player locating means in the form of moveable elements for indicating a player's location upon sad gameboard.

4,706,961

GAME OF CHANCE

Alfred H. Singleman, 7000 Lindbergh St., Philadelphia, Pa. 15153; Alfred H. Singleman, Jr., 425 Campbell Rd., Schenectady, N.Y. 12303, and Erick R. Singleman, 248 Catherine St., Albany, N.Y. 12209

Filed Jul. 1, 1986, Ser. No. 881,000
Int. Cl.[4] A63F *1/04*
U.S. Cl. 273—274 **4 Claims**



1. a game comprising:

a set of cards having identifying indicia thereon, said indicia comprising a plurality of subsets;

a legend that relates various combinations of card indicia to value indicia whereby a player may calculate the relative worth of a playing hand;

a plurality of playing boards, one for each player, each of said boards having a plurality of designated areas, each area adapted to receive a card, said designated areas aligned in groups of three or more and each of said groups positioned relative to the other groups such that the designated areas in the group each align with designated areas in the other groups, whereby players might strive to conform any of said subsets to such alignments, a pre-determined number of designated areas having markings for indicating that cards placed on such areas may be exchanged with a card aligned vertically, horizontally, or diagonally to said marked areas, there being at least 3 groups, each of which contains at least 3 designated areas, said groups being arranged such that each designated area is included in a horizontal and vertical row having at least 3 designated areas; and

at least one marked designated area on each board which is separate from the groups.

4,706,962

DART BOARD WITH TARGET PLATES STRUCTURED AS DISCRETE GRIDS

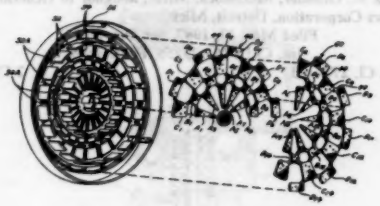
David E. Michalski, Rockford, Ill., assignor to Arachnid, Inc., Rockford, Ill.

Filed May 27, 1986, Ser. No. 867,057
Int. Cl.[4] F41J *3/00*
U.S. Cl. 273—347 **8 Claims**

1. A dart board having a target area with a plurality of differently colored scoring areas defined on it, said board having an integral support structure with means for supporting an array of target plates disposed in edge-to-edge relation within said target area so as to define said scoring areas, each

of said plates having a plurality of closely spaced holes molded in the outer face thereon,

said array of target plates being divided into a plurality of predefined groups, with adjacent plates in each group being linked together by integral fastening means to form an integral grid-like structure,



said grid-like structures adapted to be supported within said integral support structure in an overlapping relationship with each other so as to define in combination said different scoring areas on said dart board.

4,706,963

TARGET SYSTEM FOR USE IN INFRARED FIRING EXERCISES

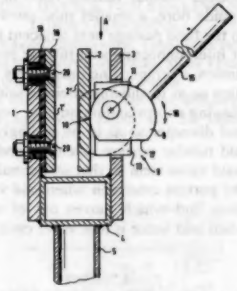
Carlheinz Geuss, Thumbachstrasse 67, 8484 Grafenwöhr, Fed. Rep. of Germany

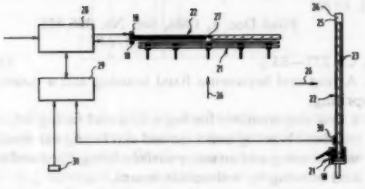
Filed Oct. 30, 1985, Ser. No. 792,978

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1984, 3439689; Apr. 17, 1985, 3513906; May 7, 1985, 3516392

Int. Cl.[4] F41J *1/08, 9/13*

U.S. Cl. 273—348.1 **13 Claims**





11. An infrared target comprising:

a. a support member comprising a thin plate of wood, said support member having a base edge;

b. a thin metallic foil covering substantially the entire area of the front surface of said support member, said foil on said front surface having a break normal to said base edge, said break dividing said front surface into left und right sections of foil of substantially equal area;

c. metallic foil on the rear surface of said wood plate interconnecting said left and right sections;

d. a series of clamping devices at spaced-apart positions along the base edge of said target on each side of said break in said foil, each of said clamping devices having at least two jaws clamping the base edge of said target therebetween;

e. a metallic rail connected to an inner surface of at least one jaw of each clamping device for making contact with said foil;

f. a power supply including a voltage step-down current step-up transformer, said transformer having one output terminal connected to metallic rails at the left section of said target and its other output terminal connected to metallic rails at the right section of said target for supplying sufficient current to heat said foil quickly to a temperature above ambient and to cause infrared radiation.

4,706,964

FOOTBALL TRAINING APPARATUS

Louis M. Genovese, route de Biot, F.06560 Valbonne, France

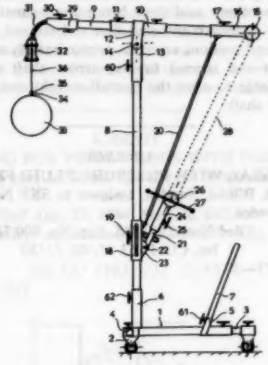
PCT No. PCT/FR85/00228, § 371 Date Apr. 21, 1986, § 102(e) Date Apr. 21, 1986, PCT Pub. No. WO86/01419, PCT Pub. Date Mar. 13, 1986

PCT Filed Aug. 26, 1985, Ser. No. 865,203

Claims priority, application France, Aug. 28, 1984, 84 13408

Int. Cl.[4] A63B *43/00*

U.S. Cl. 273—413 **13 Claims**



1. A training apparatus for footballers and for players of games of hitting, volleying and half volleying, comprising:

(a) a stand;

(b) a boom support post extending upwardly from said stand;

(c) a boom;

(d) adjustable positioning means for mounting said boom to said support post so that said boom is adjustable in height, position and inclination, said adjustable positioning means including a sleeve slidably mounted on said boom support post, a locking screw engaged with said sleeve and said boom support post for fixing the position of said sleeve on said boom support post, a stay-rod extending from said sleeve to said boom and means for adjusting the length of said stay-rod;

(e) a ball;

(f) a line attached to said ball;

(g) winding/unwinding means for winding and unwinding said line; and

(h) steadying means for steadying said ball at a predetermined vertical position with respect to said boom, whereby the vertical position of said ball with respect to

said base may be adjusted by adjusting said adjustable positioning means.

4,706,965

ARROW AND COMPONENTS THEREOF

John Schaar, 1048 W. Greenway Dr., Tempe, Ariz. 85282

Division of Ser. No. 493,958, May 12, 1983, Pat. No. 4,533,146.
This application May 31, 1985, Ser. No. 739,518
Int. Cl.[4] F41B 5/02
U.S. Cl. 273—416 1 Claim

1. An arrow shaft, comprising:

a first tubular arrow shaft end section having substantially constant and parallel inner and outer surfaces;

a second tubular arrow shaft end section having substantially constant and parallel inner and outer surfaces; and

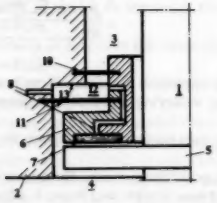
an intermediate tubular arrow shaft section fixedly coupled between said first and second tubular arrow shaft end sections, said intermediate tubular arrow shaft section having a longitudinal bore therein with an inner diameter which decreases toward the longitudinal center of said intermediate tubular arrow shaft section, said inner diameter being greatest adjacent said first and second tubular arrow shaft end sections, the wall thickness of said intermediate tubular arrow shaft section being greatest near the center of said intermediate tubular arrow shaft section and tapering down toward said first and second tubular arrow shaft sections; said shaft being approximately thirty-five inches in length and said first and second tubular arrow shaft end sections are each approximately six inches long said first and second tubular arrow shaft sections being trimmable to alter the overall weight and length of the arrow shaft.

4,706,966

SEAL WITH PRESSURE FLUID FEED

Björn Lind, Bilidal, Sweden, assignor to SKF Nova AB, Goteborg, Sweden

Filed Nov. 22, 1985, Ser. No. 800,734
Int. Cl.[4] F16J 15/40, 15/50
U.S. Cl. 277—27 5 Claims



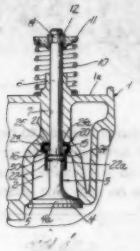
1. A seal for sealing the gap between substantially flat surfaces between two relatively movable members, a pair of spaced, flexible, substantially flat, impermeable membranes (10, 11) arranged substantially parallel to said surfaces and connected to one of the members and an element stationary relative thereto disposed between the members, the element and other member having confronting faces defining said gap therebetween, means for supplying a pressurized fluid to the space between the membranes and to a connected pocket formed in one of said faces to provide a fluid seal between said confronting faces, said space defined by rigid walls of said one member and element and flexible membranes in a predetermined configuration with at least one rigid wall extending across and within said space so that the fluid pressure in said space deflects said membranes and said element in a direction tending to close the gap.

4,706,967

VALVE GUIDE SEAL DEVICE

Hans W. Ochsner, Metamora, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 27, 1987, Ser. No. 30,842
Int. Cl.[4] F16J 15/56; F01L 3/08
U.S. Cl. 277—33 2 Claims



1. A valve guide seal for an internal combustion engine of the type having a cylinder head with at least one fluid passage therein terminating at a port, flow through which is controlled by a poppet valve having a valve stem reciprocable in the small diameter bore portion of a stepped valve stem guide bore in the cylinder head for movement between a valve closed position and a valve open position relative to said port, said valve guide seal including a seal/scraper ring retainer including at least an enlarged diameter tubular portion fixed in the said stepped valve stem guide bore, a smaller tube portion extension that depends into the fluid passage next adjacent to said port, and a flat shoulder interconnecting said tubular portion to said tube portion extension, a scraper ring operatively positioned in said tubular portion so as to slidably encircle said valve stem, said valve stem having an upstanding annular bead thereon that is of an external diameter so as to be sealingly and slidably received in said tubular portion extension and which is axially located on said valve stem so that said annular bead is moved into said tube portion extension when said valve is in a valve closed position and which moves out of said tube portion extension when said valve is in a valve open position.

4,706,968

SEALING RINGS WITH COMPLIMENTARY RING MEMBERS

David C. Orlowski, 3507 78th Ave., Drawer 940, Rock Island, Ill. 61201

Filed Dec. 1, 1986, Ser. No. 936,456
Int. Cl.[4] F16J 15/447
U.S. Cl. 277—53 11 Claims

1. A ring seal between a fixed housing and a rotating shaft comprising:

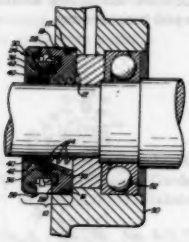
a. a first ring member having a first end facing internally to the fixed housing and a second end facing externally of the said housing and an outer surface being fixed and sealed to said housing by a shoulder means,

b. said first ring member having a series of annular grooves in the internal bore of said first ring member with said annular grooves disposed adjacent to the shaft with a slot extending across said grooves to the first end of said first ring member as a drain trough,

c. a second ring member fixed to rotate with said shaft and having an annular flange extending axially with inner and outer radial surfaces, adapted for insertion in an accomodating annular recess in said first ring member at the

interface between said first ring member and said second ring member,

d. said second ring member also having an annular recess adjacent to and complimentary with an annular recess in



the face of said second end of said first ring member at the interface of said first and second ring members, and

e. a third ring member within said complimentary, adjacent recesses in said first ring member and said second ring member.

4,706,969

FLOATING RING DEVICE FOR SEALING SHAFT OF TURBO MACHINE

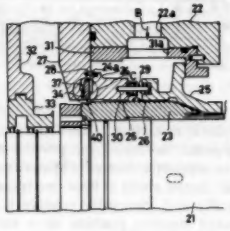
Yasushi Mouri; Kazuzo Katayama; Taku Ichiryu; Tsuneyoshi Mitsuhashi, and Masanori Kobayashi, all of Takasago, Japan, assignors to Mitsubishi Yukogyo, Japan

Filed Mar. 13, 1986, Ser. No. 839,361

Claims priority, application Japan, Jul. 22, 1985, 60-160353

Int. Cl.[4] F16J *15/34*

U.S. Cl. 277—83 **2 Claims**



1. A device for sealing the shaft of a turbo machine in which there are disposed a shaft sealing side plate attached to a casing, an atmospheric side floating ring and an in-machine side floating ring arranged in a seal case and associated with said shaft with the interposition of a small space, said atmospheric side floating ring having an atmospheric side end surface in contact with said shaft sealing side plate, said in-machine side floating ring having an in-machine side end surface in contact with said seal case; said device being characterized in that a flexible ring which is deformable in compliance with the deformation of said atmospheric side floating ring during driving is interposed between said atmospheric side floating ring and said shaft sealing side plate.

4,706,970

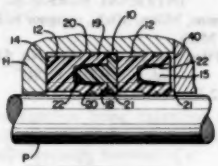
FLEXIBLE RING SEAL WITH INSERT IN CIRCUMFERENTIALLY EXTENDING CHANNEL

Pedro Ramirez, Denver, Colo., assignor to Polydyne Industries, Inc., Denver, Colo.

Filed Nov. 14, 1984, Ser. No. 671,319

Int. Cl.[4] F16J *15/24*

U.S. Cl. 277—205 **10 Claims**



1. In a sealing device of the class described wherein a flexible ring includes a circumferentially extending channel which is generally U-shaped in cross-section and which opens in an axial direction at one end of said ring, said channel bounded by axially extending sidewalls of said ring having external sealing faces engageable with relatively moving surfaces to be sealed, the combination therewith comprising:

a seal-reinforcing insert member including a flat annular disk and an annular projection extending in an axial direction from said disk, said annular projection substanitally corresponding in size and configuration to the cross-sectional size and configuration of said channel and freely insertable into said channel, said disk defining radially extending seating surface means disposed substantially normal to said sidewalls on said one end of said ring when said projection is inserted into said channel whereby to limit the depth of extension of said projection into said channel.

4,706,971

SEAL RING FOR PISTON RODS WITH PARTINGS

Alfred F. Schirmer, Im Tobel 7, CH-8706 Feldmeilen, Switzerland

Filed Aug. 23, 1984, Ser. No. 643,804

Claims priority, application Switzerland, Aug. 25, 1983, 4648/83

Int. Cl.[4] F16J *9/12, 15/10*

U.S. Cl. 277—215 **16 Claims**

1. A seal ring for piston rods, having flat side surfaces running perpendicular to its axis, for floating contact with a contiguous side surface, and having at least one outer spring element attached to it and extending around the entire circumference of the seal ring for its resilient contact pressure against the piston rod, wherein the seal ring is made of plastic material and has only one parting, a chamber ring (7) covering the parting (8) on the radially outside thereof, said chamber ring is narrower than the seal ring in the axial direction thereof and is arranged in a lateral recess of said seal ring cross-section, so that it covers the parting only on one side of the seal ring, said chamber ring having an outer side surface extending perpen-

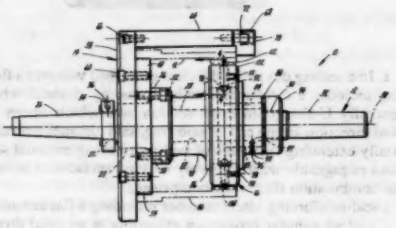
dicularly to the axis of the seal ring and extending in the same plane as one of said flat side surfaces of said inner seal ring whereby said outer side surface is arranged for floating contact with the contiguous side surface, and said seal ring having a lap joint with axially overlapping ends of said seal ring.

4,706,972

EXPANDING ARBOR FOR LOCATING THE AXIS OF AN INTERNAL SURFACE

Joseph M. Kormos, Milan, Mich., assignor to Precision Devices, Inc., Milan, Mich.

Filed Jan. 23, 1987, Ser. No. 6,076
Int. Cl.[4] B23B *31/40*
U.S. Cl. 279—2 R **12 Claims**



1. An expanding arbor apparatus for radially positioning a workpiece with respect to a reference axis, said workpiece of the type having a profiled internal surface, said expanding arbor apparatus comprising:

a spindle defining said reference axis,

a mandrel disposed on said spindle defining a first conical surface, said mandrel axially movable along said spindle,

means for defining a second conical surface,

means for axially positioning said first and second conical surfaces such that the separation therebetween may be adjusted,

a collar encircling said spindle and said conical surfaces, said collar having a plurality of radially extending bores,

a plurality of probe members installed within said collar bores, said probes movable axially within said bores and having an inner end engageable with said conical surfaces, and an outer end configured to engage said workpiece inside surface, whereby when said workpiece is loaded onto said arbor and said conical surfaces are moved toward each other, said probes expand radially outwardly, thereby engaging said workpiece inside surface and establishing the radial positioning of said workpiece.

4,706,973

CHUCK AND TOP JAW ASSEMBLIES

David S. Covarrubias, 3561 Calle Quebracho, Thousand Oaks, Calif. 91360; Reza M. Yassan, 555 Rosewood Ave., Camerillo, Calif. 93010; Maria S. Covarrubias, 3561 Calle Quebracho, Thousand Oaks, Calif. 91360, and Arturo Revuelta, 649 W. Hammel St., Monterey Park, Calif. 91754, assignors to David S. Covarrubias, Thousand Oaks; Reza M. Yassan, Woodland Hills; Maria S. Covarrubias, Thousand Oaks; Arturo Revuelta, Monterey Park and Jose Revuelta, Los Angeles, all of, Calif.

Filed Aug. 8, 1986, Ser. No. 894,681
Int. Cl.[4] B25B *5/16*
U.S. Cl. 279—1 SJ **19 Claims**

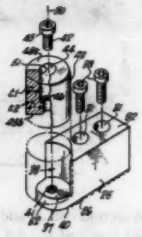
1. In any one of a plurality of top jaw assemblies radially mounted on a chuck having an axis and including a top jaw body having an inner face and an outer face defining only a complete thickness between said inner face and outer face,

a first means through such complete thickness by which said body is securable to a master jaw or the like,

the improvement comprising

a base member of lesser thickness than and mounted to and within said complete thickness extending in a direction towards the chuck's axis,

a cylindrical wall in such complete thickness extending from said outer face towards said base member to form a cutout portion with said base member,



a rotatable workable member cylindrical in nature, adaptable by working it to the configuration of a workpiece which it is to grip, mounted on said base member and directly abutting said cylindrical wall, and

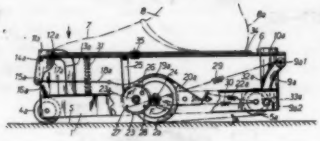
a second means comprising a threaded aperture in said base member, an opening in said rotatable member, and a screw mounted in said opening and threadable into said threaded aperture, for securing said rotatable member in such cutout portion.

4,706,974

ROLLER SKATE

Yvon M. Vincent, 1, Avenue des Bosquets, 91800 Brunoy, France

Continuation of Ser. No. 824,090, Jan. 30, 1986, abandoned, which is a division of Ser. No. 570,306, Jan. 13, 1984, Pat. No. 4,602,801. This application Feb. 26, 1987, Ser. No. 21,517
Int. Cl.[4] A63C *17/12*
U.S. Cl. 280—11.115 **9 Claims**



1. A roller skate which comprises: a roller chassis having a plurality of rollers; mounting means connected to the chassis for carrying a pedal, having a front portion and a rear portion and adapted to support a foot of a skater, to move pivotably relative to said chassis about at least one transverse axis and to move rearwardly and forwardly relative to said chassis between a forward standby position an a rearward operative position reached each time the skater applies a thrust with his heel to the rear of the pedal in the standby position; braking means mounted on the chassis so as to be operated each time the skater, with the toe of his foot, applies a thrust to the front of the pedal in the standby position and to be inoperative in the rearward position of the pedal; transmission means mounted on the chassis so as to be operated each time the skater applies a downward thrust with his foot to the pedal transferring it from its operative position into a depressed position, said transmission means coupled to at least one of said rollers carried by said chassis so as for exerting a driving action upon said at least one of said rollers at each operation of the pedal; and elastic means positioned between the chassis and the pedal for returning the pedal from its depressed position into its standby position when the skater raises his foot, said mounting means including at

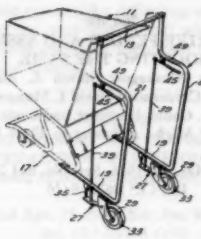
least one link rod articulated at one end to the chassis and articulated at the other end to the pedal so as to pivot freely relative to the chassis and to the pedal and in a vertical longitudinal plane between two positions, one front and the other rear, which establish respectively the standby position and the operative position of the pedal, and including at least one further elastic means being mounted for returning the link rod from its rear position to its front position.

4,706,975

DISABLED SHOPPING CART ATTACHMENT

Christopher L. Arena, 11632 Stephanie, Garden Grove, Calif. 92640, and Robert L. Prior, 13741 Malena, Tustin, Calif. 92680

Filed Jun. 9, 1986, Ser. No. 871,794
Int. Cl.[4] B62B *5/00*
U.S. Cl. 280—33.99 A **9 Claims**



1. A shopping cart attachment apparatus for direct connection to a shopping cart having wheels and a cart handle in order to allow the cart to be safely used by, and serve as a support for, mobility impaired persons, the apparatus comprising:

a pair of spaced tubular members, each of said members rigidly attached to the shopping cart at a first position which normally attaches a rear wheel of the shopping cart in substitution for that rear wheel and at a second position at an upper region of the shopping cart, each of said members having a wheel mounted to a lower portion thereof, each of said members having a generally-horizontal support section for supporting a portion of the weight of the user;

a braking mechanism disposed adjacent each of said wheels for holding the cart in the place; and

a braking mechanism actuator handle disposed adjacent at least one of said horizontal support sections for regulating the operation of said braking mechanism.

4,706,976

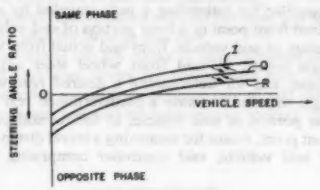
FRONT AND REAR WHEEL STEERING DEVICE

Yoshimichi Kawamoto; Yoshimi Furukawa; Tetsuro Hamada, and Mitsuya Serizawa, all of Tochigi, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 24, 1986, Ser. No. 822,010
Claims priority, application Japan, Jan. 24, 1985, 60-011836
Int. Cl.[4] B62D *6/02*
U.S. Cl. 280—91 **5 Claims**

1. A front and rear wheel steering device for a vehicle for variably controlling the steering angle ratio of rear wheels relative to front wheels according to vehicle speed, comprising:

a control means for controlling the steering angle ratio of the rear wheels as a mathematical function of vehicle speed u;



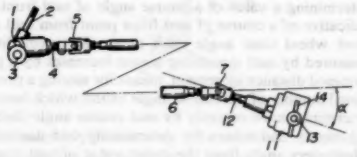
the mathematical function being expressed as $f(u)-g(u')$ where u' is a change rate of the vehicle speed and g(u') is a monotonously increasing function of u'.

4,706,977

STEERING DEVICE FOR FRONT AND REAR WHEELS

Norio Ukai, and Akira Iwasaki, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 21, 1986, Ser. No. 922,040
Claims priority, application Japan, Oct. 25, 1985, 60-164615[U]; Oct. 25, 1985, 60-164617[U]
Int. Cl.[4] B62D *7/00*
U.S. Cl. 280—91 **6 Claims**



1. A steering device for steering front and rear wheels of a motor vehicle having a vehicle frame, comprising:

a first steering gear box disposed in a front portion of the vehicle frame and including a linearly movable rack shaft operatively coupled to the front wheels, a first input shaft for moving said rack shaft, and an output shaft rotatable by movement of said rack shaft;

a second steering gear box disposed in a rear portion of the vehicle frame and including a linearly movable connecting shaft operatively coupled to the rear wheels, and a second input shaft rotatable by said output shaft for moving said connecting shaft;

a linkage shaft interconnecting said output shaft and said second input shaft and swingably coupled to said output shaft, said second input shaft being coupled to said linkage shaft at an angle with respect thereto as viewed in side elevation; and

said second steering gear box being supported on the vehicle frame for tilting movement around said connecting shaft.

4,706,978

VEHICULAR REAR WHEEL STEER ANGLE CONTROL SYSTEM

Ken Ito, Yokohama, Japan, assignor to Nissan Motor Co., Ltd.

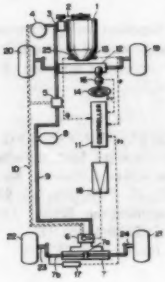
Filed Jun. 27, 1986, Ser. No. 879,303
Claims priority, application Japan, Jul. 2, 1985, 60-143842
Int. Cl.[4] B62D *7/14*
U.S. Cl. 280—91 **16 Claims**

1. A steering control system for a vehicle having at least one steerable front wheel and at least one steerable rear wheel, comprising:

sensor means comprising means for sensing an actual front wheel steer angle of said vehicle,

means for measuring a travel distance traveled by said vehicle,

a controller for estimating a path traveled by a predetermined front point of a front portion of said vehicle during motion of said vehicle, from said actual front wheel steer angle sensed by said front wheel steer angle sensing means, and for determining a desired rear wheel steer angle required to cause a predetermined rear point of a rear portion of said vehicle, to follow said path of said front point, means for measuring a travel distance traveled by said vehicle, said controller comprising means for



determining a value of a course angle of said front point indicative of a course of said front point from said actual front wheel steer angle each time said travel distance measured by said measuring means increases by a predetermined distance increment, means for storing a predetermined number of the course angle values which have been determined most recently by said course angle determining means, and means for determining said desired rear wheel steer angle from the oldest value of said predetermined number of said course angle values stored by said storing means,

actuator means for steering said at least one rear wheel of said vehicle in accordance with said desired rear wheel steer angle.

4,706,979

STEERING CONTROL SYSTEM FOR WHEELED VEHICLE

Taketoshi Kawabe, Tokyo, and Ken Ito, Yokohama, both of Japan, assignors to Nissan Motor Co., Ltd., Japan

Filed Jul. 9, 1986, Ser. No. 883,719

Claims priority, application Japan, Jul. 12, 1985, 60-152557; Jul. 13, 1985, 60-153368

Int. Cl.[4] B62D *6/02*

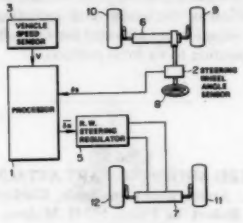
U.S. Cl. 280—91 **19 Claims**

1. A control system for steering a controlled vehicle having at least one first wheel and one second wheel, comprising

steering input means for determining a steering input quantity of said controlled vehicle.

actuating means for steering said controlled vehicle by varying a predetermined manipulated variable, and

control means for producing a control signal to command said actuating means based upon said steering input quantity, said control means comprising first reference supplying means for determining a desired value of a predetermined first vehicle motion variable in accordance with a first desired vehicle model representing a first desired vehicle, actual motion estimating means for determining an estimated value of said first motion variable corresponding to said steering input quantity in accordance with an actual vehicle model representing said controlled vehicle, first comparing means for comparing said desired and estimated values of said first motion variable, and target manipulated variable determining means for varying said manipulated variable by producing said control



signal representing a target value of said manipulated variable so as to reduce a difference between said desired and estimated values of said first motion variable.

4,706,980

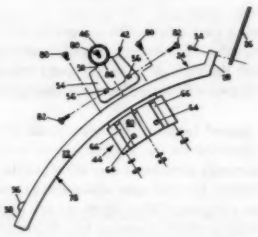
VEHICLE QUARTER FENDER AND ASSEMBLY FOR MOUNTING THE SAME

Timothy R. Hawes, Muskegon; Steven A. Antekeier, North Shores; Glenn R. Cryderman; David I. Munger, both of Muskegon; Leonard A. Gould, Fruitport, and Louis E. Eklund, Jr., Muskegon, all of Mich., assignors to Fleet Engineers Inc., Muskegon, Mich.

Filed Mar. 19, 1986, Ser. No. 841,280

Int. Cl.[4] B62B *9/16*

U.S. Cl. 280—154 **20 Claims**



1. The combination of a fender and an assembly for mounting said fender to a vehicle frame, said fender having top and bottom surfaces, a width and a flange on an inside longitudinal edge of said fender and said assembly comprising a rod secured to and positioned substantially transversely of a longitudinal axis of said frame, wherein said assembly further comprises:

a mounting means extending transversely over less than one-half of said width of said top surfce of said fender, engaging said flange and adapted to engage said rod to mount said fender to said frame; and

a rigidifying means extending transversely over more than one-half of said full width of said bottom surface of said fender, engaging said flange, secured to said mounting means and for providing rigidity to said fender when mounted to said frame.

4,706,981

VEHICULAR SPRAY DAMPENING DEVICE

Richard E. Dorwart, P.O. Box 36208, Fayetteville, N.C. 28303

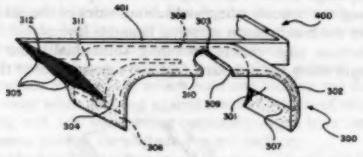
Filed Oct. 17, 1986, Ser. No. 920,156

Int. Cl.[4] B62D *25/16*

U.S. Cl. 280—154.5 R **7 Claims**

1. A vehicular spray dampening means for reducing the

discharge of spray and mist from the wheels of a vehicle comprising: an inverted, generally U-shaped manifold disposed over the wheels of the vehicle, said manifold including a lower inner wall and an upper outer wall joined along one edge and open at the opposite edge so as to define an inverted, generally U-shaped side opening adjacent the outer side of said wheels; an air scoop integrally formed with said outer wall at the



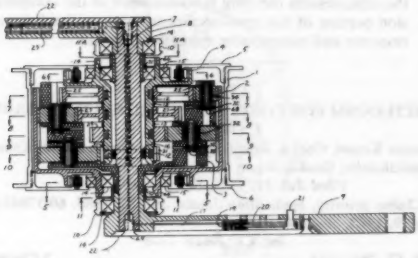
forward portion of said manifold which communicates with the interior thereof for creating an air flow through said manifold when said vehicle is in forward motion, said air flow entering said air scoop and exiting said side opening; and means adjacent said side opening for deflecting said air flow downwardly adjacent the outer side of said wheels such that said downward air flow forcefully suppresses spray and mist discharged from said wheels.

4,706,982

DUAL RANGE PLANETARY TRANSMISSION FOR PEDAL POWERED VEHICLES

Direk T. Hartmann, 4121 Morningstar Dr., Huntington Beach, Calif. 92649

Filed Apr. 21, 1986, Ser. No. 854,004
Int. Cl.[4] B62M *1/08*
U.S. Cl. 280—238 **7 Claims**



1. In a pedal powered vehicle including a frame, a driving wheel with a central hub, a pedal drive shaft on the axis of said wheel and mounted in bearings for concentric rotation with said hub, an improved multiple speed planetary transmission located within said hub for concentric rotation therewith and comprising:

a planet-gear-carrier axially fixed on said pedal drive shaft for rotation therewith;

multiple sets of different size planet gears rotatably mounted on said planet-gear-carrier;

an internally toothed ring gear in constant mesh with all of said multiple sets of planet gears and mounted for rotation about said pedal drive shaft;

external ring gear locking means operative for selectively locking said ring gear to said frame;

a sun-gear-carrier rotatably mounted in a fixed axial position on said pedal drive shaft;

external sun gear carrier locking means operative for selectively locking said sun-gear-carrier to said frame;

multiple externally toothed sun gears meshed with said multiple sets of planet gears, respectively, rotatably mounted on said sun-gear-carrier;

key means operative for selectively locking any one of said multiple sun gears to said sun-gear-carrier;

first free-wheel ratchet means coupled between said hub and said ring gear for driving said hub;

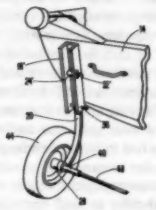
second free-wheel ratchet means coupled between said hub and said sun-gear-carrier for driving said hub; and gear ratio selection means for operating one of said ring gear locking means and said sun-gear-carrier locking means.

4,706,983

ASSEMBLY FOR TOWING A BOAT

Wayne D. Griswold, 194 Screenland Dr., Burbank, Calif. 91505

Filed Mar. 13, 1986, Ser. No. 839,108
Int. Cl.[4] B63C *13/00*
U.S. Cl. 280—414.2 **10 Claims**



1. An assembly for towing a boat behind a vehicle, said vehicle including a towing hitch having an upstanding post, said boat including connecting means at its prow for attachment to said hitch, and a transom,

characterized in that the rear of said boat is supported on a carriage comprising a pair of spaced, vertically oriented channel members attached to said transom and extending essentially the height of said transom,

a pivot pin extending through the sides of each of said channel members at the top of said channel members and a removable pin extending through the flanges of each of said channel members near the lower end thereof,

first and second elongated leaf spring supports carried in respective channel members and extending a substantial distance below said channel members and curving toward the rear relative to forward motion of said boat,

said supports each having a sleeve at each end thereof, with said pivot pins extending through the upper ones of said sleeves,

a pair of stub axles and highway wheels supported on said axles with each of said axles carried in the lower ones of said sleeves,

said axles extending a substantial distance inwardly of said leaf spring supports,

a removable stabilizing extension member coaxially connected between the extensions of said stub axles permitting limited axial movement of said wheels while preventing shimmying movement of said wheels, such that when said removable pins are in place, said leaf spring supports are confined and said wheels remain below and support said boat and when said removable pins are removed, said leaf spring supports are permitted to pivot around said pivot pins to a second position substantially within the boat.

4,706,984

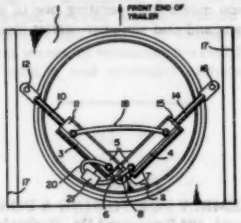
STABILIZER DEVICE FOR TRAILER

Kenneth G. G. Esler, and John A. Esler, both of c/o P.O. Box 879, Biggar, Saskatchewan, Canada S0K 0M0

Filed Dec. 23, 1986, Ser. No. 945,627

Int. Cl.[4] B60D *1/00*

U.S. Cl. 280—432 **4 Claims**



1. A stabilizing device for use on a towed vehicle comprising turntable means for mounting on the leading end of the towed vehicle; first hydraulic cylinder means pivotally connected at one end to a rotatable portion of the turntable means near one end of the rotatable portion; first piston rod means extending out of the other end of said first cylinder means and pivotally connected to a fixed portion of the towed vehicle on one side of the rotatable portion; second hydraulic cylinder means pivotally connected at one end to the rotatable portion of the turntable means at or near said one end of said first cylinder means; second piston rod means extending out of the other end of said second cylinder means and pivotally connected to a fixed portion of the towed vehicle on a second side of the rotatable portion opposite to said one side thereof; first tube means interconnecting one end of said first and second hydraulic cylinder means; second tube means interconnecting the other end of said first and second hydraulic cylinder means; control means in one said tube means, including a pair of lines for carrying hydraulic liquid between ends of the tube means containing the control means; valve means in one said line for closing said one line; sensor means for sensing the speed of the towed vehicle and for closing said valve means when the speed of the towed vehicle exceeds a predetermined maximum; and first fixed orifice means in the other said line of smaller area than said one line for carrying hydraulic fluid when said valve means is closed, whereby hydraulic fluid normally flows freely between said cylinders to permit free rotation of said rotatable portion of the turntable means and, at trailer travel speeds exceeding the predetermined maximum, the valve means closes said one line, to cause hydraulic liquid to flow through said first restricted orifice means to inhibit turning of said rotatable portion, and consequently of said towed vehicle.

4,706,985

ALPINE SKI WITH SELECTIVE REINFORCEMENT

Franklin D. Meatto, Cromwell, Conn., assignor to TriStar Sports Inc., Middletown, Conn.

Continuation-in-part of Ser. No. 582,404, Feb. 22, 1984. This application Jun. 28, 1985, Ser. No. 749,839

The portion of the term of this patent subsequent to Oct. 8, 2002, has been disclaimed.

Int. Cl.[4] A63C *5/14*

U.S. Cl. 280—610 **12 Claims**

1. In a snow ski having a predetermined cross-section with opposing first and second sides, the ski extending a desired axial length from a forward shovel area to a rear tail area, comprising in combination:

(a) a bottom running surface;

(b) a top surface;

(c) a core positioned between the bottom running surface and the top surface;

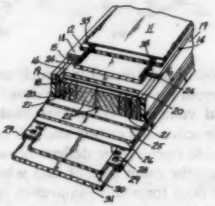
(d) a compression carrying laminate layer positioned above the core and below the top surface;

(e) a binding area intermediate the tail area and the shovel area having a front portion nearest the shovel area and a rear portion nearest the tail area;

(f) a main facing laminate layer positioned below the core and above the bottom running surface for carrying the substantial portion of the tensile loading in flexure;

(g) top edge means extending substantially the axial length along the opposing first and second sides of the ski adjacent the compression carrying laminate layer;

(h) bottom edge means extending substantially the axial length along the opposing first and second sides of the ski



adjacent the bottom running surface to provide wear-resistant surfaces;

(i) a fiber reinforced layer positioned above the compression carrying laminate layer and below the top surface; and

(j) at least one high strength fiber reinforcing means generally horizontally positioned at least partially in a slot in the fiber reinforced layer within the cross-section extending forwardly at least from the front portion of the binding area to the shovel area and rearwardly from at least the rear portion of the binding area to the tail area external of the compression carrying laminate layer in the compression portion of the cross-section to increase the flexural response and compressive strength of the ski.

4,706,986

MECHANISM FOR LOCKING OPENED STATE OF BABY CARRIAGE

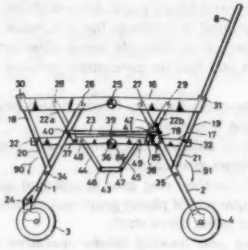
Kenzou Kassai, Osaka, Japan, assignor to Aprica Kassai Kabushikikaisha, Osaka, Japan

Filed Jul. 31, 1986, Ser. No. 891,759

Claims priority, application Japan, Jul. 31, 1985, 60-170416; Aug. 9, 1985, 60-123471[U]

Int. Cl.[4] B62B *7/08*

U.S. Cl. 280—642 **3 Claims**



1. A mechanism for locking the opened state of a baby carriage, which baby carriage comprises a pair of first legs, a pair of second legs, and a pair of lateral frames each extending between said first leg and said second leg on the same side, each said lateral frame being foldable in a lateral plane of the

baby carriage, whereby when each said lateral frame assumes its unfolded state, said first leg and said corresponding second leg are moved away from each other to establish the opened state of the baby carriage and, on the other hand, when each said lateral frame assumes its folded state, said first leg and said corresponding second leg are moved toward each other to establish the closed state of the baby carriage, said mechanism being characterized in that:

at least one of said second legs is provided with a bracket extending toward said first leg on the same side, with a foldable locking rod turnably connected between said bracket and said corresponding first leg,

said second leg is provided with a fixed attitude control surface and a slider, which hold said locking rod therebetween while abutting against lateral portions of said locking rod, said slider being constantly urged by a spring to move toward the attitude control surface;

an unlocking engagement portion on one side of said locking rod and on the same side of said attitude control surface is formed to extend from said slider; and

said slider is provided with an operating lever adapted upon turning to abut against said bracket to slide said slider away from said attitude control surface, whereby said unlocking engagement portion engages said locking rod to move the latter toward the folded state.

4,706,987

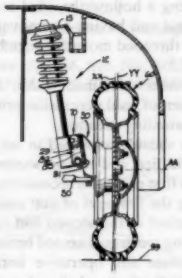
CAMBER ADJUSTMENT METHOD

Craig R. Pettibone, Lafayette, and Jimmy D. Berry, Longmont, both of Colo., assignors to Specialty Products, Inc., Longmont, Colo.

Continuation-in-part of Ser. No. 692,825, Jan. 18, 1985, Pat. No. 4,616,845. This application Aug. 4, 1986, Ser. No. 893,153

Int. Cl.[4] B62D *17/00*

U.S. Cl. 280—661 **2 Claims**



1. A method of adjusting the camber of a wheel in a vehicle suspension system of the type ordinarily including a generally vertically extending strut assembly having an upper end attached to a vehicle frame assembly and having a pair of strut flanges positioned in parallel relationship with one another and projecting laterally outwardly from a lower end portion of the strut assembly; a wheel knuckle assembly mounted on the strut assembly and having a mounting portion positioned between the two strut flanges with a first hole therein adapted to closely, axially slidingly receive a first bolt therein which also passes through a first pair of coaxially aligned holes in the strut flanges in close axially sliding relationship and with a second hole therein adapted to closely, axially slidingly receive a second bolt which also passes through a second pair of coaxially aligned holes in the strut flanges in close axially sliding relationship, the first and second holes in the wheel knuckle mounting portion being vertically spaced apart, the first and second bolt holes in the wheel knuckle mounting portion and the first and second pair of holes in the strut flanges having axes positioned in substantially perpendicular relationship with the axis of rotation of a wheel supported on the wheel knuckle, the camber adjustment method comprising:

(a) removing the first bolt from the first hole in the wheel knuckle and the first pair of aligned holes in the strut flanges;

(b) producing oppositely positioned, parallel, laterally extending slots in said pair of strut flanges having a vertical dimension approximately equal to the diameter of one of said first pair of holes and an expanded lateral dimension by lateral extension of said first pair of holes therein;

(c) providing a cam bolt assembly comprising:

an elongate threaded shaft portion having a central shaft longitudinal axis, a first end and a second end and having a diameter approximately equal to said first bolt;

a cylindrical cam portion having a cylindrical axis positioned in parallel offset relationship with said shaft central longitudinal axis and positioned at said first end of said shaft portion;

a bolt torquing portion positioned at a terminal portion of said first end of said shaft portion;

a nut threadingly mountable on said second end of said threaded shaft portion;

(d) providing a cam plate comprising:

parallel cam engagement surfaces extending perpendicular to the direction of extension of said parallel laterally extending slots and spaced apart by a distance slightly larger than the diameter of said cylindrical cam portion of said cam bolt;

a cam plate slot extending laterally between said cam engagement surfaces and having approximately the same configuration as the slots in the strut flanges and having strut flange engaging means for maintaining the cam plate in fixed relationship with an associated strut flange;

(e) placing the cam plate in engagement with an outer surface of one of the strut flanges with the cam plate slot in aligned relationship with the laterally extending slot in the flange;

(f) inserting the shaft portion of the cam bolt assembly through the slots in both strut flanges an the cam plate and through the first hole in the wheel knuckle mounting portion and positioning the cylindrical cam portion of the cam bolt assembly between the parallel cam engagement surfaces of the cam plate;

(g) threading the cam assembly nut onto the cam shaft portion so as to prevent substantial axial movement of the cam bolt assembly and so as to allow rotational movement of the cam assembly;

(h) maintaining the second bolt passing through the strut flanges and wheel knuckle in sufficiently loose engagement therewith so as to allow pivotal movement of the wheel knuckle assembly about the second bolt;

(i) adjustably laterally moving the cam bolt assembly shaft portion within the slots in the strut flanges and cam plate so as to pivotally move the wheel knuckle assembly to adjust the camber of the associated wheel by selectively rotating the cam bolt assembly about the central longitudinal axis of the cylindrical cam portion thereof.

4,706,988

PNEUMATIC SPRING SUPPORT SYSTEM

Orville R. Young, R.R. 1, Box 60, Horace, N. Dak. 58078

Filed Nov. 7, 1986, Ser. No. 928,813

Int. Cl.[4] B60G *5/04, 11/46*

U.S. Cl. 280—676 **5 Claims**

1. A support for the center spring ends of a tandem axle assembly comprising:

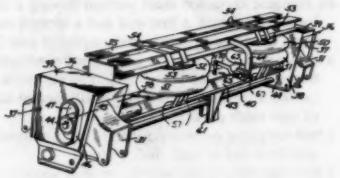
a mounting cross beam adapted to support a portion of a vehicle and adapted to be fixed relative to the vehicle, a pair of tandem axle spring hangers fixed at opposite ends of said mounting cross beam and thus fixed with respect to the vehicle;

a movable cross beam positioned between said tandem axle

spring hangers, said movable cross beam having portions extending through provided slots in said tandem axle spring hangers, means mounted on said portions in said tandem axle spring hangers for mounting tandem axle springs at opposite ends thereof;

a cross tube extending between the lower ends of said tandem axle spring hangers reinforcing said spring hangers and being spaced below the movable cross beam;

controllable air bag means operable between said movable cross beam and said mounting cross beam, said air bag



means comprising a pair of air bags that are between the tandem axle spring hangers and with each one adjacent to one of the tandem axle spring hangers, the air pressure to the air bags, and thus the vehicle height, being controlled by means of a pneumatic circuit connected to the airbags in parallel; and

valve means to sense the position of said movable cross beam relative to said mounting cross beam for providing controllable pressure to each of the air bags to optimize the height of the vehicle in response to the load.

4,706,989

REAR INDEPENDENT SUSPENSION FOR AUTOMOTIVE VEHICLE

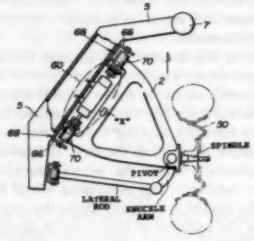
Yoshitaka Iijima, and Hiroshi Noguchi, both of Atsugi, Japan, assignors to Nissan Motor Co., Ltd., Japan

Filed Jun. 6, 1986, Ser. No. 871,482

Claims priority, application Japan, Jun. 12, 1985, 60-127476; Jun. 15, 1985, 60-90464[U]

Int. Cl.[4] B60G *3/00*

U.S. Cl. 280—701 **10 Claims**



1. In a vehicle having a chassis

a rear suspension comprising:

a rear suspension arm;

hinge means for interconnecting said rear suspension arm to said chassis, said hinge means including an elastomeric bush which distorts when the vehicle is subject to a lateral force;

a lateral rod pivotally connected at its inboard end to an essentially immovable portion of said chassis;

a knuckle arm pivotally connected to the outboard end of said lateral rod;

a spindle on which a rear road wheel of the vehicle is supported;

means for mounting said spindle on said suspension arm so to be pivotal about an axis which permits the road wheel to be steered and the amount of one of the toe-in and the toe-out of the road wheel to be varied;

said knuckle arm being connected to said pivotally mounting means for varying the orientation of said spindle with respect to said chassis upon the vehicle being subject to a lateral force in a manner which steers the road wheel;

a sensor responsive to a vehicle operational parameter; and

means responsive to said sensor for modifying the distortion of said elastomeric bush and thus varying the steering of said road wheel by said lateral rod and said knuckle arm.

4,706,990

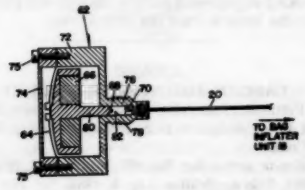
MECHANICAL IMPACT SENSOR FOR AUTOMOTIVE CRASH BAG SYSTEMS

George L. Stevens, N. Ogden, Utah, assignor to Morton Thiokol, Inc., Chicago, Ill.

Filed Feb. 28, 1986, Ser. No. 835,084

Int. Cl.[4] B60R *21/08*

U.S. Cl. 280—734 **1 Claim**



1. An impact sensor for an automotive crash bag system for detecting the occurrence of a crash comprising,

a cylindrical casing having a first end and a second end, said casing including a hollow threaded mounting member at said second end and having a removable cap closing the first end, said threaded mounting member having a tapped hole therein,

a percussion primer contained within said casing at said second end thereof, said percussion primer being mounted within said mounting member,

an inertial mass slidably arranged in said casing for movement from said first end to said second end, said inertial mass having a first end and a second end with said first end thereof facing the first end of said casing,

a firing pin attached to the second end of said inertial mass,

over-center spring means connected between said casing and said inertial mass and operative normally to bias said inertial mass to the first end of said casing thereby to hold said firing pin out of engagement with said percussion primer, said over-center spring means comprising an over-center concave diaphragm that is retained at the peripheral edges thereof between the first end of said casing and said removable cap,

said inertial mass being attached to said diaphragm at a central location thereof and including an integral rod extending into said threaded mounting member with said firing pin attached to the end of said rod in facing relation to said percussion primer, oil canning action of said diaphragm acting to restrain said inertial mass until a predetermined acceleration level is reached that is high enough to produce a force sufficient to buckle said diaphragm, and upon buckling, over-center action causing said diaphragm to assist the inertial force to cause said firing pin to strike said percussion primer to produce a detonating shock wave, and

a fitting for the attachment of a pyrotechnic transmission line mounted in said tapped hole in said threaded mounting member.

4,706,991

TRAILER FRONT STONE GUARD

Mahlon A. Miller, P.O. Box 30, Nappanee, Ind. 46550

Filed Nov. 25, 1985, Ser. No. 801,634
Int. Cl.[4] B60R *19/00*; B60J *11/00*
U.S. Cl. 280—770 4 Claims

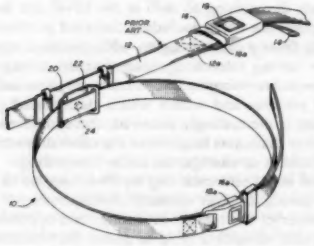
1. In combination, a stone guard and a towable trailer, said trailer including a front wall which includes a channel part, said stone guard including a sheet of durable shape returning material adjustably carried by said trailer, said sheet shiftable between an extended position covering a portion of said trailer front wall and a retracted position within said channel part wherein said trailer front wall portion is exposed.

4,706,992

SEAT BELT

Deborah L. Downing, and Nicholas P. Carnegis, both of Rte. 3, 447-B, Rosharon, Tex. 77583

Filed Jan. 2, 1986, Ser. No. 815,511
Int. Cl.[4] B60R *22/02*; A44B *21/00*
U.S. Cl. 280—801 6 Claims



1. A seat belt attachment device for connecting a supplemental seat belt with a preexisting vehicle seat belt comprising:

a base plate having a belt plate affixed by pivotal connection thereto;

a supplemental seat belt affixed to said belt plate for encircling the torso of a user and thereby enabling movement by the user about said pivotal connection;

said base plate having a slot means therein for receiving a looped portion of the preexisting seat belt anchored to the vehicle, and

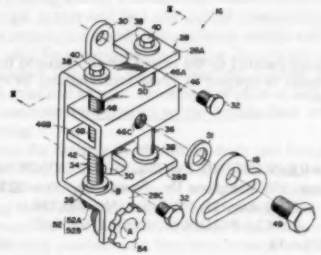
keeper means for insertion through said looped portion for precluding separation of the preexisting seat belt from said base plate.

4,706,993

APPARATUS FOR ADJUSTING POSITION OF SEATBELT WEBBING AT WHICH IT IS RETAINED BY VEHICLE BODY

Keiichi Tamura, Aichi, Japan, assignor to Kabushiki Kaisha Tokai-rika-denki-seisakusho, Japan

Filed Jun. 20, 1986, Ser. No. 876,438
Claims priority, application Japan, Jun. 24, 1985, 60-95643[U]
Int. Cl.[4] B60R *21/10*
U.S. Cl. 280—808 16 Claims



1. An apparatus for adjusting the position of a webbing fastened to the body of an occupant with respect to the body of a vehicle, comprising:

a base member secured to the vehicle body;

a main shaft rotably supported by said base member and having an external thread formed on the outer periphery thereof along its longitudinal axis;

a subsidiary shaft secured to said base member and disposed so as to extend parallel to said main shaft;

a movable member slidably engaged to said subsidiary shaft and threadedly engaged with the external thread of said main shaft, said movable member being movable along the axis of said main shaft and guidable by said subsidiary shaft in response to the rotation of said main shaft;

positioning means secured to said movable member and adapted to determine a position of the webbing with respect to the vehicle body; and

rotating means for rotating said main shaft including a control knob and a bevel gear means operatively disposed between the main shaft and the control knob to conveniently orient the axis of rotation of the knob horizontally, whereby the positioning means secured to the movable member may be manually moved to any selected point along the longitudinal axis of the main shaft.

4,706,994

REPORT COVER

William E. Lockhart, 7324 Campbell Rd., Dallas, Tex. 75248

Continuation of Ser. No. 445,148, Nov. 29, 1982, Pat. No. 4,548,426. This application Apr. 24, 1985, Ser. No. 726,489
The portion of the term of this patent subsequent to Oct. 22, 2002, has been disclaimed.
Int. Cl.[4] B42D *3/00, 15/00*; B41L *3/00*; B42C *11/00*
U.S. Cl. 281—29 14 Claims

1. A report cover for holding a report, comprising:

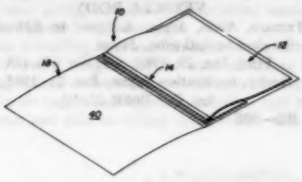
a front panel having a first edge and at least three parallel hinges proximate the first edge;

a back panel;

the report being fastened to the front and back panels with first fastening means between the front and back panels along one edge of the report, the fastening of the front panel being between the first edge of the front panel and the closest hinge to said first edge; and

the front panel being folded about said at least three parallel hinges to cover the edge of the report and hold the report and fastened to the back panel by second fastening means when the report is fastened between the front and back

panels, the portion of the front panel between the first edge and first hinge thereof pivoting about the first hinge



to remain parallel to the report where fastened thereto as the report is opened to resist forces acting to close the report.

4,706,995

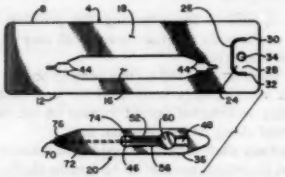
BOOKMARK/WRITING INSTRUMENT COMBINATION

Kip H. Dopp, 108 Donielson Dr., Newcastle, Wyo. 82701

Filed Aug. 11, 1986, Ser. No. 895,330

Int. Cl.[4] B42D *9/00*; G09F *3/00, 9/00*

U.S. Cl. 281—42 **15 Claims**



1. A bookmark/writing instrument combination comprising

a thin, generally planar card made of a flexible material and having a cut-out section formed therein for receiving and holding a writing instrument, and

a writing instrument including

a thin, generally planar piece of material dimensioned to fit within the cut-out section of said card in a co-planar relationship therewith,

means for releasably holding the piece of material in place within the cut-out section of the card, and

marking means disposed on the piece of material to enable writing on or otherwise marking an object.

4,706,996

HOSPITAL FORM SET WITH DETACHABLE BAG

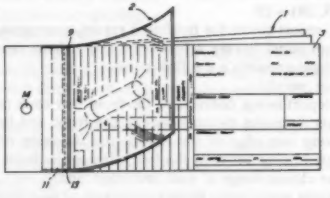
Thomas I. K. Fasham, Brighton, England, assignor to Moore Business Forms, Inc., Grand Island, N.Y.

Filed Sep. 11, 1984, Ser. No. 649,539

Claims priority, application United Kingdom, Sep. 14, 1983, 8324568

Int. Cl.[4] B41L *1/20, 1/22*

U.S. Cl. 282—1 R **5 Claims**



1. A medical business form system comprising, in combination, a business form set having a plurality of interleaved record sheets with transfer material, said set having means associated with said record sheets for receiving information relating to a medical test specimen, a liquid impervious bag for receiving a container containing said medical test specimen, an open end for passage of said container therethrough, said bag having liquid impervious closure means along said open end for ensuring that the contents of said bag are prevented from escaping therefrom, said bag being constructed to prevent leaking therefrom if liquid contents escape from said container located in said bag, and means for detachably securing said bag to a face of one of said record sheets of said business form set, said bag being sized and positioned so as to be substantially confined within the periphery of said form set, said bag and said container being separable from said business form set for analysis for said specimen while said form set is maintained intact for recording the details of said analysis.

4,706,997

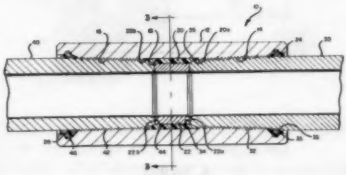
COUPLING FOR TUBING OR CASING AND METHOD OF ASSEMBLY

Kenneth J. Carstensen, 4540 No. 44th St., No. 70, Phoenix, Ariz. 85018

Continuation of Ser. No. 379,615, May 19, 1982, abandoned. This application Nov. 27, 1985, Ser. No. 802,943

Int. Cl.[4] F16L *15/00*

U.S. Cl. 285—13 **22 Claims**



1. A coupling collar for A. P. I. standard round or buttress thread tubing or casing having a nose surface at the end thereof, a side bevel adjacent the nose and having a specified angle relative to the longitudinal axis of the tubing or casing, a threaded region of pitch and thread depth in accordance with specified tolerances between the bevel and a last scratch mark, the threads diminishing to zero in the bevel and last scratch mark regions, the collar including threaded portions tapering oppositely from a central region with specified taper angles, the collar having tolerances closer than the tubing or casing tolerances and terminating in end recess portions adjacent the threaded portions and within which the ends of tubings or casings are to be matingly received, the end recess portions having inner diameters larger than the outer diameters of fully inserted tubings or casings, the collar comprising:

a central metal reference ring member coupled to the collar and having an inner diameter corresponding to the inner diameter of the tubings or casings and oppositely facing reference shoulders lying in planes perpendicular to the central axis of the collar and spaced apart by a predetermined distance related to an acceptable range of taper and size variations for the unmodified A. P. I. tubing or casing such that engagement of the nose of an unmodified A. P. I. tubing or casing against a reference shoulder of the ring member is determinative of the degree of thread engagement desired for the tubings or casings relative to the collar;

means defining central grooves in the collar, each disposed between a different one of the reference shoulders and the adjacent threaded portion and having a depth no greater than the depth of the threads;

a pair of central seal means, each positioned in a different central groove and proportioned to be engaged and compressed by the side bevel of the nose of the A. P. I. tubing

or casing and to extend into the start of the threads on the side bevel when the nose of the tubing or casing is in contact with the ring member to provide a seal against internal pressures that cannot be displaced by such internal pressures;

means defining end grooves in each of the end recess portions outside the threaded portions of the collar; and

a pair of end seals each disposed in a different one of the end grooves, the end seals each engaging the adjacent received A. P. I. tubing or casing in the region of the last scratch mark thereof and being dimensioned to be compressed into the inital threads in the last scratch mark region when the nose of the tubing or casing is in contact with the ring member to provide a seal against external pressures, the end seals being configured to deform outwardly into the end recess portion in response to internal pressures and thereafter return to position to provide sealing, whereby the collar is both adequately mechanically engaged in the threaded load bearing region and the threaded region is sealed at both ends such that the collar can matingly receive unmodified A. P. I. tubings or casings without the presence of weakened regions due to the introduction of mechanical stress risers in the collar and provides sealing of the threaded portions under varying conditions of operation.

4,706,998

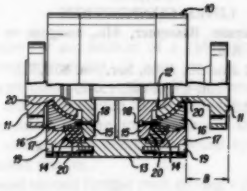
AXIAL DISPLACEMENT COUPLING

George W. Peppel, Arlington, and Paul E. Sullivan, Bedford, both of Tex., assignors to Lockheed Corporation, Calabasas, Calif.

Continuation of Ser. No. 678,348, Dec. 5, 1984, abandoned. This application Sep. 8, 1986, Ser. No. 904,867

Int. Cl.[4] F16L *27/06*

U.S. Cl. 285—167 **3 Claims**



1. A flexible connector for effecting fluid-tight flexible joints between fluid conduits comprising:

(a) a housing having ends and defining a central bore having a longitudinal axis;

(b) a pair of connecting conduits, each connecting conduit having curved flanges, which having first and second ends, said first end of each connecting conduit having curved flanges, which extend into said central bore from opposing ends of said housing, respectively, said second end of each connecting conduit for effecting a fluid-tight junction between the housing and external fluid conduits;

(c) a first compression ring positioned adjacent said curved flanges of said first end of each connecting conduit which extends into said central bore, said first compression ring being elastically compressible when an angular force is applied to said flanges to permit angular deflection of said flanges with respect to the longitudinal axis of said central bore;

(d) a second compression ring positioned between said first compression ring of each connecting conduit and the inner wall of said housing so that said flanges and said associated first compression ring can move axially with respect to the longitudinal axis of said central bore of said housing when a force is applied to said flanges along the longitudinal axis of said central bore, said second compression ring being a reinforced elastomeric collar, said collar being reinforced with metal elements bonded to said elastomer to form a laminate so that the elastomeric collar can compress and expand in response to the application of a force to said connector along the longitudinal axis of said housing;

(e) an inner lock ring attached to said first compression ring of each connecting conduit and in contact with the interior wall of said associated flange so that when said inner lock ring is tightened against said first compression ring, said associated flange is compressed therebetween;

(f) an outer lock ring for attachment to each of said ends of said housing having a connecting conduit extending therethrough so that said first and second compression rings of each connection conduit are retained within said housing and said first compression ring is in contact with said associated flange of said connecting conduit to permit both axial and angular movement of each of said connecting conduits with respect to the longitudinal axis of said housing;

(g) means for limiting the distance which said flange of each connecting conduit may move along the longitudinal axis of said housing when a force is applied to said connector along the longitudinal axis of said housing; and

(h) means for holding said housing, said flanges of each connecting conduit, said first compression ring, said second compression ring, said inner lock ring and said outer lock ring in functional relationship.

4,706,999

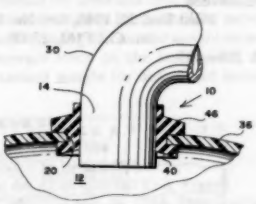
FLEXIBLE, RESILIENT SADDLE FOR SWINGJOINT

Maurice A. Hynes, 2775 SW. 46th Ave., Ft. Lauderdale, Fla. 33314

Filed Dec. 23, 1985, Ser. No. 812,754

Int. Cl.[4] F16L *5/02*

U.S. Cl. 285—196 **14 Claims**



1. A flexible resilient saddle for effecting a a fluid path for a swingjoint between a primary channel and a secondary channel, said secondary channel oriented normally to the flow axis of said primary channel, said flow path passing thru an aperture in said primary channel, the saddle comprising:

(a) a longitudinal drum-like bore having a hollow internal surface corresponding to said secondary channel, said bore having an inner end for interfacing with said primary channel and an outer end opposite thereto for interfacing with swingjoint extension means of said secondary channel, said longitudinal bore further comprising a hollow cylindrical structure defined by at least one radially disposed solid of rotation, the inner most radii thereof defining the radius of said secondary channel:

(b) an inner peripheral collar depending integrally normally outwardly from a radially outer area of said inner end of said bore, said inner collar comprising means for pressfittable, fluid tight insertion into said aperture and, thereby, into said primary channel, said inner peripheral collar further comprising an inner solid annulus depending radially outwardly from said bore, said solid annulus defined by a first solid of rotation, rotated about a radius defined by said aperture within said primary channel, said inner collar having an inner radial surface extending into said

primary channel, said inner surface defining an angle of about 15° with reference to the plane of said aperture in said primary channel, said aperture defining the fluid interface between primary and secondary channels, said angle radiating away from said aperture plane in the direction of said primary channel such that the greatest thickness of said inner collar is at its outer circumference; and

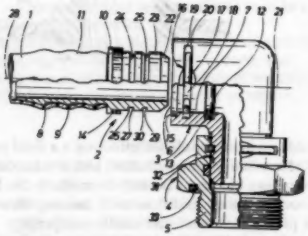
(c) an outer peripheral collar depending integrally normally outwardly from an outer surface proximate to said outer end of said drum-like bore, said outer collar axially separated from said inner collar by a dimension generally coresponding to the wall thickness of said primary channel, said collars having respective opposing facing surfaces for fluid tight resilient engagement with the inner and outer walls of said primary channel about said aperture, said outer peripheral collar further comprisiag an outer solid annulus, having an outer surface depending radially outwardly from said bore, said outer annulus defined by a second solid of rotation, larger in rotational cross-section than said first solid, said second solid of rotation also rotated about said aperture-defined radius, of said primary channel whereby a fluid tight path between said primary channel and said secondary channel is achieved through said press-fitable insertion of said inner collar into said aperture of said primary channel and, further whereby, radial fluid pressures within said primary and secondary channels will urge said annular collars and said longitudinal bore into resilient fluid tight communication with said inner and outer walls of said primary channel and about said aperture at the interface between said primary and secondary channels.

4,707,000

COUPLING ARRANGEMENT FOR PRESSURIZED MEDIUM LINES

Ralph Torgardh, Västra Frölunda, Sweden, assignor to AB Volvo, Sweden

Filed Dec. 20, 1985, Ser. No. 811,772
Int. Cl.[4] F16L *37/00*
U.S. Cl. 285—305 **8 Claims**



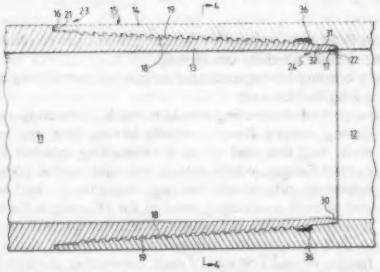
1. A coupling arrangement for pressurized medium lines comprising a female coupling component and a male coupling component which can be connected to one another and separated from one another, an open end in the female component for receiving the male component, a locking arrangement for said components which maintains the coupling components fully connected one to the other in an inner locked position and which permits the coupling components to be separated in a releasing position, said locking arrangement comprising a locking device attached to the female component, a first recess in the male component, said locking device being arranged to be introduced into said first recess in the inner locked position of said coupling components, at least one sealing element to provide a seal between the coupling components where they are connected in their inner locked position, a second recess in said male component to which said locking device is first brought for the purpose of locking the coupling components in an outer locked position as the two coupling components are connected one to the other, in which outer locked position incomplete sealing is provided and the two coupling components are locked so that they are prevented from being separated but are allowed to be brought further together into the inner locked position in order to permit the coupling components to be fully connected one to the other, whereby, in the presence of pressurized medium, an indication in the form of an audible sound of leakage that the outer locked position has been adopted can be obtained from the leakage of pressurized medium, said locking device consisting of a locking ring, a slot in the female component, said locking ring being positioned in said slot and arranged to assume a first radial position in said inner and outer locked positions of said coupling components and to be sprung out of said first radial position into a second radial position as the two coupling components are brought together and after passing the outer locked position but before adopting the inner locked position, and the first and second recesses consisting of first and second grooves, respectively, said second groove having a stopping surface located closest to a front end of the male component and facing away from said front end, and an oblique guide surface located behind it, more distant from said front end and so arranged to press the locking ring into its second radial position.

4,707,001

LINER CONNECTION

Frederick W. Johnson, Bessemer, Ala., assignor to Seal-Tech, Inc., Bessemer, Ala.

Filed Jun. 20, 1986, Ser. No. 876,712
Int. Cl.[4] F16L *15/00*
U.S. Cl. 285—332.3 **19 Claims**



1. A multi-seal pin and box connection for tubular members comprising:

(a) a multi-groove helical thread with each groove having an entrant portion equidistant with adjacent groove entrant portions and with each groove including a negative draft load flank;

(b) a seal ring groove formed in the box portion of said connection immediately adjacent the innermost thread thereof for carrying a deformable thermoplastic seal therein such that the said pin portion's thread extends into said seal ring groove compressing said seal ring; and

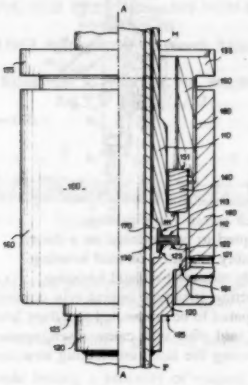
(c) a primary interference seal formed between said pin and box immediately adjacent said seal ring groove.

4,707,002

METHOD AND DEVICE FOR CONNECTING A SUBMERSIBLE ELEMENT TO AN ENCLOSURE UNDER VERY HIGH PRESSURE

André Boissier, Fontainebleau; Jean Chabat-Courrede, Moret S. Loing, and Michel Decaudin, Cannes Ecluse, all of France, assignors to Electricite de France (Service National), Paris, France

Filed Jan. 25, 1984, Ser. No. 573,797
Claims priority, application France, Feb. 4, 1983, 83 01757
Int. Cl.[4] F16L 19/03
U.S. Cl. 285—334.2 2 Claims



1. A device for connection of a cylindrical element to a tubular sleeve, comprising

a first flange connected to the tubular sleeve,

a second flange connected to the cylindrical element,

a resilient metal sealing joint having T-shaped cross-sectional configuration being interposed between said first and second flanges,

said first and second flanges each having a main end bearing surface and a secondary frustroconical bearing surface cooperating respectively with a main member and a cross bar of the T-shaped sealing joint,

a tubular male screwthreaded member having a thrust shoulder engaging an associated thrust shoulder being provided on said first flange through a ring member,

a tubular female screwthreaded member screwed onto said tubular male screwthreaded member and having a thrust shoulder adapted to engage a first thrust shoulder provided on said second flange,

said second flange having a second thrust shoulder at one end of the device,

said tubular male screwthreaded member having a latching edge at the other end of the device,

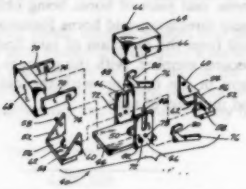
said latching edge on said tubular male screwthreaded member and said second thrust shoulder on said second flange being adapted to receive a high external radial pressure by means of a tool so as to compress said joint substantially axially and without securing said tubular female screwthreaded member against rotation, said tubular female member being screwed onto said tubular male screwthreaded member without imparting any substantial torque to said tubular sleeve until said thrust shoulder on said tubular female screwthreaded member engages with said first thrust shoulder on said second flange and maintains said device in a compressed condition.

4,707,003

RELEASABLE LOCK MECHANISM

Donald L. Read, P.O. Box 25007, Denver, Colo. 80225

Filed Sep. 5, 1986, Ser. No. 904,066
Int. Cl.[4] E05C 19/02
U.S. Cl. 292—45 10 Claims



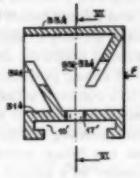
1. Releasable lock mechanism, comprising: a support including an upright wall, a horizontal pivot means projecting normal to the wall, a pair of gripping members disposed alongside the wall and pivoted together, scissor fashion, on the pivot means and providing a pair of upwardly divergent arms above the pivot means and a pair of complementary, depending jaws below the pivot means, the jaws being biased toward each other to a closed position but forcibly movable apart to an open position, means mounting the pivot means on the wall for limited upward and downward movement of the pivot means and jaws, first weight means carried by the wall and engaging the pivot means for resisting downward movement of the pivot means and jaws, second weight means carried by the wall and including a portion entering between the divergent arms from above and acting to spread the arms and thus to forcibly open the jaws, and a latch element carried by the wall for movement between a first position engaging the second weight means and intercepting its downward force on the arms and a second position freeing the second weight for downward movement to act on the arms.

4,707,004

LATCH ASSEMBLY

Marc F. Varlet, 8 rue des Ecoles, 56410 Etel, France

Division of Ser. No. 603,297, Apr. 24, 1984. This application Oct. 11, 1985, Ser. No. 787,626
Claims priority, application France, Apr. 29, 1983, 83 07546
Int. Cl.[4] E05C 17/52
U.S. Cl. 292—91 3 Claims



1. A latch assembly comprising a first member and a second member, said first and second members being formed with respective means for catching said first member in said second member upon movement of said members towards each other, and a first attachment member and second attachment member, each being formed with means for attaching to one of a fixed and a moveable frame member, with at least on of said first and second members and respective first and second attachment members being formed with cooperative attachment means for selectively attaching the re-

spective first or second member to the respective attachment member, said first member being formed with a flexible arm and a transversely disposed catch piece at the end thereof and said second member being formed with catch means to hold the catch piece upon said movement of said members towards each other, said catch means comprising a first pair of horns forming a first groove and a second pair of horns being disposed behind said first pair of horns, said pairs of horns being obliquely disposed in opposite directions, said horns forming an opening when viewed from the direction of said first member towards the second member, with the grooves aligned to receive the arm in the opening with the catch piece disposed behind the pairs of arms.

4,707,005

LATCHING MECHANISM

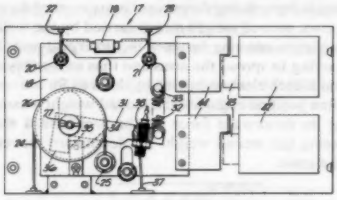
George W. Dyson, Wolverhampton, England, assignor to Chubb & Son's Lock and Safe Company Limited, Middlesex, England

Filed Jul. 8, 1986, Ser. No. 883,188

Claims priority, application United Kingdom, Jul. 19, 1985, 8518234

Int. Cl.[4] E05C *9/00*

U.S. Cl. 292—332 **5 Claims**



1. A latching mechanism for the closure of a container comprising a plurality of spaced-apart latching elements biased to extend into latching positions in which they are adapted to retain the closure in its closed position; means for withdrawing the latching elements from their latching positions in response to operation of a handle or other like user-operable member; retaining means for automatically retaining the latching elements in their withdrawn positions consequent upon the aforesaid withdrawal; and release means for automatically releasing said retaining means, thereby to allow the latching elements to move to their latching positions, consequent upon movement of the closure to its closed position; said latching elements all being connected to a common actuating member so as to move therewith; said actuating member normally being biased to a first position corresponding to the latching positions of the latching elements but being movable by operation of said user-operable member to a second position corresponding to the withdrawn positions of the latching elements; said retaining means being biased towards a retaining position and having a portion which is engageable with an abutment on said actuating member to keep the retaining means in a released position away from its retaining position while the actuating member is in its first position but which is released by said abutment to permit the retaining means to move to its retaining position when the actuating member moves to its second position; the retaining means being connected to said release means so as to be movable thereby from its retaining position to its released position.

4,707,006

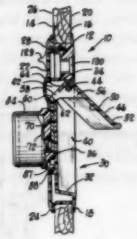
DOOR LATCH ASSEMBLY

Yogesh K. Garg, Wooster, and Robert E. Hoffacker, Millersburg, both of Ohio, assignors to Camrey Industries, Inc., Wooster, Ohio

Continuation of Ser. No. 514,775, filed as PCT US81/01345, Oct. 6, 1981, abandoned. This application Jan. 31, 1986, Ser. No. 824,320

Int. Cl.[4] E05C *9/10*

U.S. Cl. 292—336.3 **17 Claims**



1. A door latch asembly comprising:

a housing adapted to be mounted on a door;

a handle movably mounted on said housing;

a dish rotatably mounted on said housing;

a latch connecting structure operatively connected to said dish and adpated to be connected to a door latch such that rotation of said dish will cause disengagement of such latch by causing the latch connecting structure to move; and,

means operatively connected to said handle and to said dish for rotating said dish when force is applied to said handle and the handle is thereby moved, the assembly including means to mount the assembly in an orientation such door handle force application both causes dish rotation and applies a force to a connected door in the general direction such door opens.

4,707,007

STRIKER MEANS FOR AUTOMOTIVE DOOR LATCH ASSEMBLY

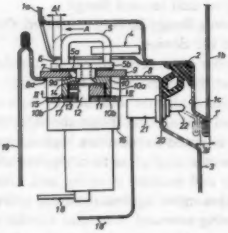
Isamu Inoh, Tokyo, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 6, 1986, Ser. No. 827,788

Claims priority, application Japan, Feb. 7, 1985, 60-022498; Feb. 7, 1985, 60-016348[U]; Feb. 7, 1985, 60-016349[U]; Feb. 7, 1985, 60-016350[U]; Feb. 26, 1985, 60-027984[U]

Int. Cl.[4] E05C *21/02*

U.S. Cl. 292—341.16 **24 Claims**



1. A striker means for automotive door latch assembly, comprising: a latch member mounted to a jamb surface of a door; and a striker member mounted to an opposing surface of

a vehicle body, which opposes the jamb surface of the door when the door is closed, for engagement with the latch member, further comprising:

a guide means for guiding the striker member for motion along a closing direction of the door, and a drive means for driving the striker member along the closing direction of the door when the latch member has been engaged with the striker member, and

the drive means comprising a drive source, a cam fixed to an output shaft of the drive source, a cam follower fixed to a base end of the striker member for cooperation with the cam.

4,707,008

PORTABLE MULTIPOSITIONABLE LOCKING BODY MOLDING FOR FERROUS AND NON-FERROUS VEHICLES

Ted Falco, 13943 Biscayne Blvd., North Miami Beach, Fla. 33181

Filed May 9, 1986, Ser. No. 861,598
Int. Cl.[4] B60R *13/02*
U.S. Cl. 293—128 **12 Claims**

1. A portable multi-positionable locking body molding for a ferrous or non-ferrous vehicle comprising, in combination:

an elliptical body molding,

said body molding having a generally hollowed out underside,

said underside having a plurality of magnet posts situated perpendicular to said underside,

said underside having a plurality of suction cup cylinder stands situated perpendicular to said underside,

a plurality of vinylized magnets such that said magnets are adhesively attached to the top of said magnet posts on the underside of said body molding,

a plurality of suction cups having suction cup stems such that said suction cup stems are adhesively attached, and insertable into each situation cup cylinder stand to the underside of said body molding,

a plurality of locking device housings,

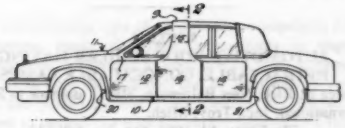
a plurality of locking devices, said locking devices being integrally relates with said body molding and attached by means of a pin to the underside of the body molding which is recessed within said locking device housing of the said body molding.

4,707,009

AUTOMOBILE SIDE PROTECTOR

John L. Barnett, 23812 Country View Dr., Diamond Bar, Calif. 91765

Filed Dec. 29, 1986, Ser. No. 946,853
Int. Cl.[4] B60R *19/02*
U.S. Cl. 293—128 **7 Claims**



1. An automobile side protector for guarding both sides of an automobile against dents and scratches from adjacent automobile doors and other sources, said protector comprising:

a saddle band of sufficient length to pass over the top of an automobile;

right and left tabs affixed to said saddle band and said tabs being grippable by the door or window of the automobile to be protected, each of said tabs having dowel means positioned away from their line of attachment to the saddle band;

right and left downwardly extending support bands affixed to the saddle band at the point of attachment of the tabs; and

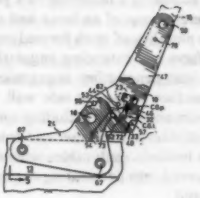
each of said support bands holding at least one protective pad so that the pads extend downwardly a sufficient distance to extend about to the rocker panel of the automobile to be protected and each of said at least one protective pads extending forwardly and rearwardly away from said support bands.

4,707,010

INERTIAL LATCHING MECHANISM FOR SEAT ASSEMBLIES

George Croft, and Martyn Hiscox, both of Mississauga, Canada, assignors to Canadian A.S.E. Limited, Downsview, Canada

Filed Oct. 27, 1986, Ser. No. 923,530
Claims priority, application Canada, Oct. 25, 1985, 493889
Int. Cl.[4] B60N *1/02*
U.S. Cl. 297—379 **10 Claims**



1. In a vehicle seat assembly having a seat member and a backrest member pivotally tiltable over the seat member, a backrest latching mechanism comprising:

a first latch means fixed relative to one of said members;

a second latch means pivotally mounted on the other of said members for pivotal movement thereof between an unlatched position in which the second latch means is positioned so as to avoid latching engagement with the first latch means upon tilting movement of the backrest member over the seat member and a latched position in which said second latch means is positioned latchingly to engage with the first latch means to prevent tilting movement of the backrest member over the seat member;

pendulum means pivotally mounted on the other of said members for pivotal movement independently of the pivotal movement of the second latch means between first and second pendulum limit positions, at which limit positions the pendulum means impinges upon the second latch means;

whereby, in the normal upright position of the backrest member, the pendulum means is gravity biased to the first pendulum limit position so as to urge the second latch means towards the unlatched position thereof; and

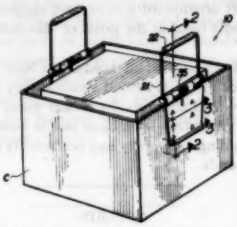
whereby, upon the occurrence of a first vehicular deceleration force sufficient to overcome the gravity biasing of the pendulum means to the first limit position thereof, the pendulum means pivotally moves to the second pendulum limit position thereby increasing the sensitivity of the mechanism to latching, such that, upon the attainment of a second greater vehicular deceleration force, the second latch means moves rapidly to the latched position thereof.

4,707,011

HANDLE ATTACHMENT FOR CARDBOARD BOXES

Richard L. McKim, Jr., P.O. Box 521306, Miami, Fla. 33152

Filed Jan. 13, 1986, Ser. No. 818,350
Int. Cl.[4] B25B *7/02*
U.S. Cl. 294—16 **12 Claims**



1. A handle attachment for a cardboard box having at least one flat side wall, comprising:

(a) an inner leaf and outer leaf removably connected to the flat side wall and at least partially defining a hinge means for movably interconnecting said inner and outer leaves to one another,

(b) each leaf including a facing surface positioned to engage a corresponding one of an inner and outer surface of the flat wall, a plurality of teeth formed on at least one of said facing surfaces and extending angularly outwardly therefrom and into penetrating engagement with the corresponding surface of the flat side wall,

(c) said hinge means further including spring means disposed in biasing relation to said inner and outer leaves for urging said leaves towards each other, whereby said plurality of teeth are forced into penetrating engagement with the flat side wall, and

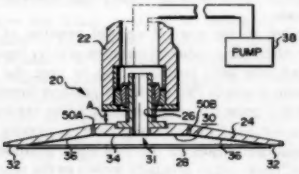
(d) handle means for lifting the box pivotally connected to said hinge means and selectively positionable into and out of a substantially coplanar position relative to the side wall, said substantially coplanar position of said handle means relative to the flat side wall defining a lifting position of said handle means and said handle means being swingable into overlaying relation of the box wall defining a stored position.

4,707,012

VACUUM HOLDER

Eizi Takagi, Ooita, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 3, 1986, Ser. No. 925,930
Claims priority, application Japan, Nov. 5, 1985, 60-247510
Int. Cl.[4] B66C *1/02*
U.S. Cl. 294—64.1 **16 Claims**



1. A vacuum holder for a semiconductor wafer comprising:

a chuck having an exterior surface, an interior surface, an outer circumference, and a circumferential flat portion extending horizontally inward from the outer circumference;

a recess, having a shape of a frustum, formed in the interior surface and bounded at a base by the circumferential flat portion;

a suction pipe, joined to the interior surface, for drawing in air from the vicinity of said recess; and

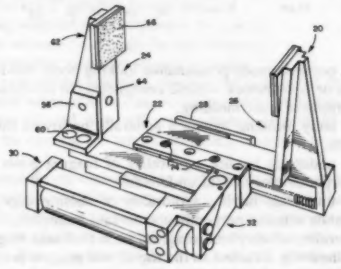
a plurality of opening means, each communicating from the exterior surface to the interior surface, for allowing external air to flow into an inner space of said recess, and for reducing an imbalance of vacuum pressure distribution in the recess when the vacuum holder picks up a semiconductor wafer having an orientation flat positioned radially inward from the circumferential flat portion.

4,707,013

SPLIT RAIL PARALLEL GRIPPER

John M. Vranish, Crofton, Md.; Wayne R. Bunch, Lovettsville, Va., and William L. Johns, Pecatonica, Ill., assignors to The United States of America as represented by the Secretary of Commerce, Washington, D.C.

Filed May 30, 1986, Ser. No. 868,485
Int. Cl.[4] B25J *15/08*
U.S. Cl. 294—119.1 **20 Claims**



1. A gripper comprising:

a frame;

a parallel rack and pinion drive subassembly comprising a pinion rotatably mounted on said frame, a first elongate rail and a second elongate rail mounted parallel to each other in operable engagement on corresponding sides of said pinion, said rails having an inner bearing surface along at least part of the lengths thereof on the inner sides thereof facing said pinion and an outer bearing surface on the outer sides opposite said rail inner sides;

a first gripper finger mounted to said first rail;

a second gripper finger mounted to said second rail;

a first linear bearing mounted on said frame for engaging one of said inner and outer bearing surfaces of said first rail;

a second linear bearing mounted on said frame for engaging one of said inner and outer bearing surfaces of said second rail; and

bearing means mounted on said frame for engaging the other of said inner and outer bearing surfaces of said first and second rails.

4,707,014

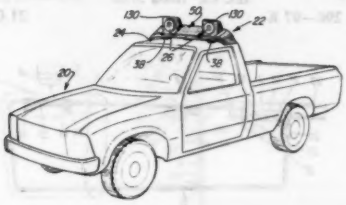
AUTOMOTIVE ROOF SPOILER HAVING RETRACTABLE, CONCEALABLE LAMPS

Lawrence D. Rich, New Baltimore, Mich., assignor to Riverside International, Inc., Troy, Mich.

Filed Nov. 14, 1986, Ser. No. 930,833
Int. Cl.[4] B62D *35/00;* **B60Q** *1/00*
U.S. Cl. 296—1 S **18 Claims**

1. An automotive roof spoiler having at least one retractable, concealable lamp, said roof spoiler including free side end

portions and a midportion therebetween, said side end portions curving upwardly into said midportion, a forward leading edge portion of said roof spoiler having a generally V-shaped configuration with a top surface inclined generally upwardly from said leading edge portion and a bottom surface of said midportion generally horizontal to define an airfoil shape reducing air frictional drag, attachment means for attaching said automotive roof spoiler to a roof of a vehicle generally transverse to a longitudinal axis of said vehicle with said midportion bottom



surface spaced above said roof, at least one opening through said midportion top surface and said spoiler midportion having at least one said lamp located therein within said opening, said lamp rotatably mounted on an axis generally parallel to a longitudinal axis of said spoiler midportion, and power means attached to said lamp adapted to rotate said lamp about said axis from a first position wherein a front surface of the lamp is generally horizontal for on-road use to a second position wherein the front surface of said lamp is generally vertical and extends above said spoiler top surface for off-road use.

4,707,015

SELF INFLATABLE AIR DEFLECTOR

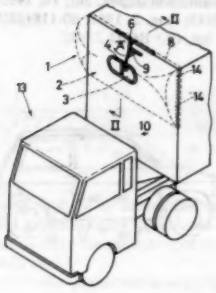
Roy D. Klomfass, Edenvale, South Africa, assignor to Jorn Laursen, Pretoria, South Africa, a part interest

Filed Sep. 17, 1986, Ser. No. 908,668

Claims priority, application South Africa, Sep. 20, 1985, 85/7231; Mar. 27, 1986, 86/2318

Int. Cl.[4] B62D *35/00*

U.S. Cl. 296—1 S **20 Claims**



1. A self-inflating type of air deflector comprising an inflatable member made of flexible, substantially air impervious sheet material and having at least one air inlet to provide for inflow of air into the member; the air inlet having a substantially rigid periphery and being carried by support means arranged to project the inlet forwardly relative to a front wall of a vehicle or load carrying body in use, the inflatable member including means for the operative attachment thereof over a predetermined area of such frontal wall of the vehicle; the inflatable member being shaped to provide, in the inflated condition, a substantially streamlined, dome-shaped deflector surface over at least a part of the frontal wall of the vehicle.

4,707,016

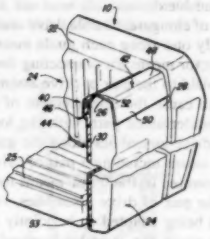
TAILGATE CAP AND COVER ASSEMBLY

Dean McDonald, Grand Blanc, Mich., assignor to Durakon Industries, Inc., Lapeer, Mich.

Filed Mar. 2, 1987, Ser. No. 20,628

Int. Cl.[4] B62D *33/02*

U.S. Cl. 296—39 R **20 Claims**



1. A cap and cover assembly adapted to be mounted to the tailgate of a pick-up truck,

said cap having a top and downwardly extending sides that substantially conform to the contours of the upper portion of the tailgate and a locking channel;

said cover having locking means at its upper portion configured to slide within said locking channel for securement thereto;

whereby, said cap and cover interlock such that said assembly can be readily mounted to a pick-up truck tailgate to protect and decorate the tailgate.

4,707,017

ADJUSTABLE HEIGHT WINDSHIELD APPARATUS FOR MOTORCYCLES

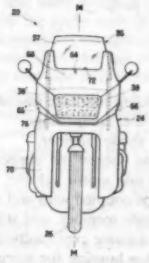
Shinichi Minobe, and Tatsuo Ueda, both of Shizuoka, Japan, assignors to Koito Seisakusho Co., Ltd., Tokyo, Japan

Filed Jan. 6, 1987, Ser. No. 1,214

Claims priority, application Japan, Jan. 13, 1986, 61-4680; Jan. 13, 1986, 61-4681; Jan. 14, 1986, 61-5999; Jan. 14, 1986, 61-6000

Int. Cl.[4] B62J *17/04*

U.S. Cl. 296—78.1 **17 Claims**



1. An adjustable height windshield apparatus for a motorcycle having frame means including a cowling of substantially bilateral symmetry with respect to the median plane of the motorcycle, the windshield apparatus comprising:

(a) a windshield to be disposed across the median plane of the motorcycle for reciprocating movement relative to the cowling and frame means along a predetermined path,

the windshield having a pair of opposite sides extending along the predetermined path;

(b) a pair of guide means to be rigidly mounted behind portions of the cowling on both sides of the frame means of the motorcycle in symmetrical arrangement with respect to the median plane of the motorcycle so as not to obstruct a driver's field of view forwardly of the motorcycle, the guide means including a pair of windshield guide portions which extend along the opposite sides of the windshield and which define the predetermined path of the windshield;

(c) a pair of elongate, flexible drive assemblies slidable longitudinally one along each guide means;

(d) connector means for connecting the opposite sides of the windshield to the pair of drive assemblies, respectively, in order to cause the displacement of the windshield along the predetermined path with the longitudinal movement of the drive assemblies along the guide means; and

(e) drive means including a pair of drive wheels to be rotatably mounted to the frame means for driving engagement with the pair of drive assemblies, respectively, the drive wheels being adapted to be jointly revolved bidirectionally to cause the joint longitudinal displacement of the drive assemblies along the guide means and, in consequence, of the windshield back and forth along the windshield guide portions of the guide means.

4,707,018

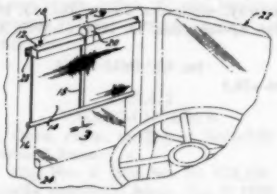
FREE STANDING SUNSHADE ASSEMBLY

James A. Gavagan, Center Line, Mich., assignor to Irvin Industries, Inc., Rochester Hills, Mich.

Filed Feb. 7, 1986, Ser. No. 827,455

Int. Cl.[4] B60J *3/02*

U.S. Cl. 296—976 **13 Claims**



1. A free standing sunshade assembly adapted to be mounted to a motor vehicle, comprising:

a retractable shade member,

shade housing means for supporting said shade member relative to said motor vehicle,

a stiffener tape coupled with said shade member for positioning said shade member, said stiffener tape being conformable to an arcuate cross-sectional shape,

a stiffener tape housing for storing said tape, said stiffener tape disposed in said stiffener tape housing and separately coiled and displaced from the shade member therein such that said tape may be extended from and retracted into said stiffener tape housing, and

a stiffener tape guide mounted adjacent said stiffener tape housing and defining an arcuate-shaped groove which conforms said stiffener tape to said arcuate shape as said stiffener tape is withdrawn from said housing.

4,707,019

MOUNTING HOUSING FOR SUN VISOR FOR VEHICLES

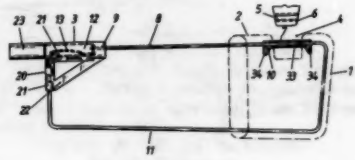
Charles Ebert, Luxeuil, France; Hermann Krehl, Baden-Baden; Lothar Viertel, Berus, both of Fed. Rep. of Germany; Bernard Hilbert, Cappel, France, and Rüdiger Walter, Ladenburg, Fed. Rep. of Germany, assignors to Gebr. Happich GmbH, Fed. Rep. of Germany

Filed Jan. 15, 1987, Ser. No. 4,330

Claims priority, application Fed. Rep. of Germany, Jan. 22, 1986, 3601761

Int. Cl.[4] B60J *3/02*

U.S. Cl. 296—97 K **21 Claims**



1. A mounting housing for connecting a sun visor body to a sun visor shaft, the mounting housing comprising:

a housing body for being embedded in a sun visor body;

a first insertion opening in the housing body for enabling insertion into the housing body of a first end of a stiffening wire associated with the sun visor body;

a second insertion opening in the housing body, communicating with the first insertion opening; and

a spring disposed in the second insertion opening, the spring having a sun visor body stiffening wire receiving hole for receiving an end of a stiffening wire of a sun visor body to effect an interconnection between the spring and the stiffening wire.

4,707,020

BODY STRUCTURE OF A MOTOR VEHICLE HAVING EXTERIOR PANELS MADE OF SYNTHETIC RESINS

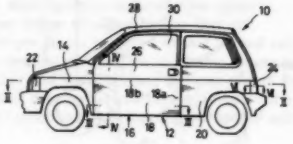
Susumu Enokida, and Jun Ono, both of Utsunomiya, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 15, 1986, Ser. No. 886,494

Claims priority, application Japan, Jul. 16, 1985, 60-155086; Jul. 25, 1985, 60-163015; Aug. 2, 1985, 60-118138[U]

Int. Cl.[4] B62D *27/02*

U.S. Cl. 296—191 **12 Claims**



1. A body structure of a motor vehicle, comprising:

a front fender panel made of synthetic resin and mounted on the outside of a strength member which provides the vehicle body with mechanical strength; and

a door positioned next to and rearwardly of said front fender panel and consisting of a door inner panel made of a rigid material and a door outer panel fitted to the outside of said door inner panel;

said front fender panel being fixed at a front end portion thereof to said strength member in a longitudinal direction of the vehicle body and retained at a rear end portion by said strength member slidably in the longitudinal direc-

tion, said rear end portion of said front fender panel being offset in an inward-outward direction of the vehicle body relative to a front end portion of said door outer panel.

4,707,021

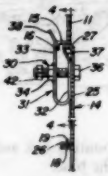
ENCLOSURE PANEL FOR TRACTOR

Lynn A. Meier, East Dubuque, Ill., and Arvid H. Saele, Peosta, Iowa, assignors to Deere & Company, Moline, Ill.

Filed Nov. 4, 1986, Ser. No. 926,710

Int. Cl.[4] B60J *9/00*; E05C *3/24*

U.S. Cl. 296—196 **6 Claims**



1. A latch on a cover panel for an opening in which the panel overlaps an edge portion of a wall structure forming said opening, comprising: A U-shaped channel with one long leg and one short leg and having a pair of aligned openings and with a part rigid with the long leg being internally threaded at the opening; a headed stud extending through the panel and in said channel at said openings and having a shank threadedly received in the internal threads, said stud being positioned in said panel so that when in a latched position the long leg is positioned behind and the shorter leg is positioned in front of said edge portion.

4,707,022

SLIDING ROOF FOR AN AUTOMOBILE

Rudolf Roos, Maintal; Albert Schlapp, Dreieich, and Dieter Federmann, Hanau, all of Fed. Rep. of Germany, assignors to Rockwell-Golde G.m.b.H., Fed. Rep. of Germany

Filed Sep. 2, 1986, Ser. No. 902,982

Claims priority, application Fed. Rep. of Germany, Sep. 11, 1985, 3532318

Int. Cl.[4] B60J *7/053*

U.S. Cl. 296—222 **4 Claims**

1. In a sliding roof for an automobile having a rigid sliding lid and lateral guide rails on which said rigid lid is slidably guided beneath a fixed automobile roof surface, that improvement consisting of:

a movable lid liner connected to said rigid sliding lid which participates with said sliding lid in opening, lifting, lowering, and closing movements of said rigid sliding lid;

guide elements for slidably guiding said movable lid liner on said lateral guide rails responsive to said opening and closing movements of said rigid sliding lid; and

said guide elements each comprising a two-armed lever and a guide shoe in which said two-armed lever is pivotally mounted and in which one end of said lever is pivotally connected to said movable lid liner by articulation means and the other end of such lever is pivotally connected to said sliding lid, said guide elements during said lowering movement of the rigid lid simultaneously raise the lid liner, and during said lifting movement simultaneously lower the lid liner.

4,707,023

FOLD-AWAY CHAIR

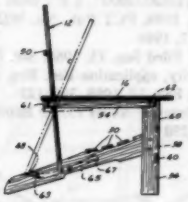
William S. Hickey, Grosse Pointe Farms, Mich., assignor to Willsboro Wood Products, Detroit, Mich.

Continuation-in-part of Ser. No. 791,521, Oct. 25, 1985, Pat. No. 4,635,998. This application Nov. 12, 1986, Ser. No. 929,637

The portion of the term of this patent subsequent to Jan. 13, 2004, has been disclaimed.

Int. Cl.[4] A47C *4/00*

U.S. Cl. 297—31 **1 Claim**



1. A fold-away chair adapted to be pivoted from a position of use to a collapsed position, comprising a combined seat bottom and rear leg assembly, a seat back assembly, a front leg assembly, a pair of arm rests, and a sliding pivot assembly to facilitate folding, said combined seat bottom and rear leg assembly comprising laterally spaced side rails having front seat bottom portions and rear leg portions, transverse slats connecting the front seat bottom portions of said side rails, a first transverse load-bearing member connecting the front ends of the front seat bottom portions of said side rails, said front leg assembly comprising laterally spaced front legs, first means pivoting said front legs near their midpoints to the front ends of the seat bottom portions of said side rails, a second transverse load-bearing member connecting said front legs beneath said first pivot means, said seat back assembly comprising longitudinal slats connected near their midpoints by an upper transverse bar and connected near their lower ends by a lower transverse bar, each arm rest having an elongated rib secured to the underside thereof and extending lengthwise thereof from a point near the rear end of said arm rest to a point short of the front end thereof, each front leg having a transverse plate at the upper end thereof, second means pivoting the rear ends of the elongated ribs of said arm rests to said upper transverse bar of said seat back assembly and third means pivoting the front ends of said elongated ribs to the upper ends of said respective front legs, said sliding pivot assembly comprising sliding pivot pins on the ends of said lower transverse bar of said seat back assembly, arcuate tracks on said side rails extending generally lengthwise thereof in which said pivot pins are slidably received, said pivot pins providing the sole means of transferring the load of said seat back assembly and of the rear end portions of said arm rests to said side rails, said tracks having downwardly and forwardly sloping terminal locking portions at their front ends in which said sliding pivot pins are received and retained in the position of use of said chair, the slope of said terminal locking portions being such that said sliding pivot pins lift out of said locking portions with a camming action when said seat back assembly is pushed forwardly to initiate the folding of said chair to a collapsed position, and releasable pins engaging said front legs and the front ends of the seat bottom portions of said rails to lock said chair in its position of use in which, when said chair is supported on a horizontal surface, said front legs are substantially vertical and their transverse plates abut the front ends of said elongated ribs of said arm rests, said combined seat bottom and rear leg assembly slopes downwardly from front to rear, and said first loading-bearing

member bears upon said second loading-bearing member at a point well below said transverse slats of said combined seat bottom and rear leg assembly, said chair being foldable when said releasable pins are released to a collapsed position in which, when said collapsed chair is supported on a horizontal surface, said front legs are substantially horizontal and extend generally parallel to said side rails.

4,707,024

SAFETY SEAT FOR THE CONVEYANCE OF BABIES AND VERY SMALL CHILDREN IN VEHICLES

Margarete Schräder, Marktleugast, Fed. Rep. of Germany, assignor to Frankonia Kinderausstattungen GmbH & Co. KG, Düren, Fed. Rep. of Germany

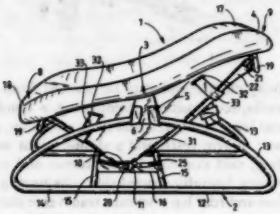
PCT No. PCT/DE85/00317, § 371 Date Jun. 9, 1986, § 102(e) Date Jun. 9, 1986, PCT Pub. No. WO86/01778, PCT Pub. Date Mar. 27, 1986

PCT Filed Sep. 11, 1985, Ser. No. 872,664

Claims priority, application Fed. Rep. of Germany, Sep. 13, 1984, 8427054; Feb. 22, 1985, 3506122

Int. Cl.[4] A47D *15/00*; B60R *21/00*

U.S. Cl. 297—250 **42 Claims**



1. A safety seat for the conveyance of babies and very small children in vehicles having

a holder frame (2),

a seat shell (1) swivelably supported therein about a shaft located in its crosswise direction and lockable in various swiveled positions relative to the holder frame (2), and

at least one belt guide (5) for receiving an automatic lap and shoulder belt (30) or lap belt,

characterized in that the locking catch (11) for attaining a long lever arm on the part of the locking action is disposed in a region, located far distant from the swivel bearing (3), of the seat shell outside that forms the bottom (10) of the seat shell (1), inside the overlapping area of the holder frame (2) and seat shell (1) and between them; and

includes a manually operable locking member (24), which is shiftable toward the holder frame (2) and can be brought into engagement with the holder frame (2).

4,707,025

ROCKER RECLINER

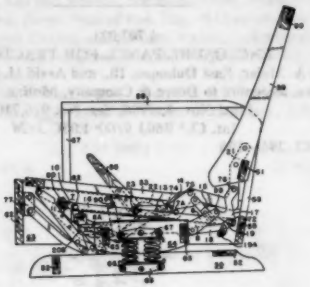
Walter C. Rogers, Jr., Denton, N.C., assignor to Parma Corporation, Denton, N.C.

Filed Jun. 26, 1986, Ser. No. 878,702

Int. Cl.[4] A47C *3/02*

U.S. Cl. 297—259 **24 Claims**

1. In a three-way recliner chair including a base, and a seat and backrest assembly including a seat and backrest, a linkage system for mounting the seat relative to base and the backrest relative to the seat for movement between a generally upright position and a reclined position, the linkage system including a backrest link fixed to the backrest and pivotally connected to the seat, a front mounting link pivoted intermediate its ends to the seat at a first location while also being pivoted directly to the backrest link at a second location spaced from said first location, means pivotally interconnecting the front mounting link and the base at a third location spaced from said first location on one side of said first location opposite said second location while permitting translation of the front mounting link relative to the base, and a rear mounting link located rear-



wardly of the front mounting link and pivotally connected to the backrest link and the base.

4,707,026

MOBILE ROCKING WHEELCHAIR WITH POSITION LOCKING MEANS

Paul J. Johansson, 1416 Grant Rd., Northbrook, Ill. 60062

Filed Jun. 2, 1986, Ser. No. 870,249

Int. Cl.[4] A47D *13/10*; A47C *3/02*

U.S. Cl. 297—281 **5 Claims**

1. A mobile rocking wheelchair, comprising:

a mobile base support unit said unit including an H-shaped frame having a pair of outer wheel support members and a cross support member connecting said pair of wheel support members, each of said wheel support members having a pair of substantially identical wheels mounted thereto;

a single pedestal mounted on said unit H-shaped frame cross support member and having substantially parallel four bar linkage assembly means mounted thereon for providing a rocking motion to a chair unit mounted on said assembly means, including a fixed support frame mounted on said assembly means with said chair unit mounted thereon, said assembly means including a first fixed frame bar mounted onto said pedestal and three pairs of interconnected pivotable bars mounted on opposite sides of said frame bar to provide said rocking motion, a first and second pair of said interconnected bars are mounted at one end to said frame bar and the third pair of bars is interconnected to the second ends of said respective first and second pair of bars, said support frame being unitarily mounted by a chair support bar onto said third pair of bars, said first pair of bars having a length substantially shorter then said second pair of bars and said second pair of bars having a length substantially shorter than said third pair of bars and said frame bar having a length greater than the lengths of said first, second and third pair of bars; and

locking means for locking said chair unit into a non-rocking position.

4,707,027

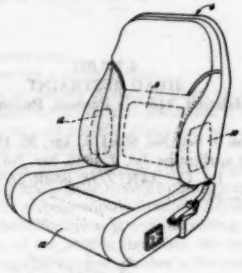
PNEUMATICALLY CUSHIONED VEHICLE SEAT(S) AND APPARATUS AND METHOD TO ADJUST THE SAME

Zoltan L. Horvath, Birmingham; Gary A. Kavanagh, Roseville; Steven F. Manning, Novi; Ronald J. Pyszel, Sterling Heights; Lloyd W. Rogers, Utica, and Edgar H. Schlaps, Washington, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Feb. 28, 1986, Ser. No. 834,425

Int. Cl.[4] A47C 3/00

U.S. Cl. 297—284 **6 Claims**



1. A switching and pumping arrangement for a vehicle pneumatic seat having a pneumatic cushion selectively adjustable to a desired firmness by a seat occupant comprising:

valving means for selectively allowing fluid communication with said cushion;

powered inflation-deflation means for filling and evacuating said cushion;

switching means accessible to and adjustable by said seat occupant having an activated and deactivated position for controlling said valving means and said powered inflation-deflation means;

means for determining the pressure within said cushion and generating a signal in response thereto;

power shut off means for deactivating said powered inflation-deflation means in response to said signal when the pressure within said cushion exceeds a maximum value or submerges below a minimum value;

closing means for closing said valve in response to said signal means when the pressure within said valve exceeds a maximum value or falls below a minimum value; and

means for preventing the re-activation of said powered inflation-deflation means until said manually activated switching means is deactivated.

4,707,028

ADJUSTABLE CHAIR

Gino Gamberini, Toscanella Di Dozza, Italy, assignor to C.O.M. Cooperativa Operai Mobilieri S.C.R.L., Italy

Filed Jul. 15, 1986, Ser. No. 885,958

Claims priority, application Italy, Jul. 18, 1985, 3506 A/85

Int. Cl.[4] A47C 3/00

U.S. Cl. 297—300 **11 Claims**

1. An adjustable chair comprising:

a support base;

a chair body including

a seat portion

a seat back portion; and

an inner frame including a lower portion extending along said seat portion, an upper portion extending along said seat back portion, and first hinge means for connecting said lower and upper portions for rotation thereof in relation to one another about a first horizontal axis; and

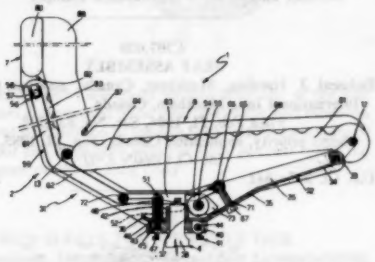
an articulated mechanism connecting said chair body to said support base, said articulated mechanism including

first and second resilient means,

a first portion extending along a front part of said lower portion of said frame and connected to said lower portion of said frame,

a second portion extending along both said upper portion of said frame and a rear part of said lower portion of said frame,

second hinge means for connecting a first intermediate point of said first portion to a front end of said second



portion of said mechanism for rotation thereof in relation to one another about a second horizontal axis parallel to said first axis and against the action of said first resilient means,

third hinge means for connecting a second intermediate point of said first portion and said support base for rotation thereof in relation to one another about a third horizontal axis parallel to said first and second axes and against the action of said second resilient means, and

fourth hinge means for connecting said second portion of said mechanism to said upper portion of said frame for rotation thereof in relation to one another about a fourth horizontal axis parallel to said first, second and third axes.

4,707,029

APPARATUS FOR SUPPORTING PARTS OF FURNITURE

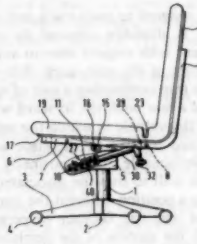
Heinrich Korn, Maintal, Fed. Rep. of Germany, assignor to Roder GmbH Sitzmobelworke, Frankfurt, Fed. Rep. of Germany

Filed Jul. 25, 1986, Ser. No. 889,404

Claims priority, application Fed. Rep. of Germany, Aug. 7, 1985, 3528335

Int. Cl.[4] A47C 3/00

U.S. Cl. 297—300 **8 Claims**



1. An apparatus for supporting parts of a piece of furniture,

especially a backrest support of a desk chair on a lower support thereof, comprising:

a spring with first and second ends, said first end of said spring abutting a pivotally mounted plate;

an adjustment member coupled to said spring for varying biasing of said spring;

a bent link tube having a first end located at said second end of said spring and an opposite second end supporting said adjustment member;

a cylindrical force transmission member connected to and controlled by said adjustment member, and guided for sliding movement in said link tube to change characteristics of said spring; and

coupling means, mounted in said link tube, for connecting and for controlling forces exerted by said adjustment member on said force transmission member.

4,707,030

SEAT ASSEMBLY

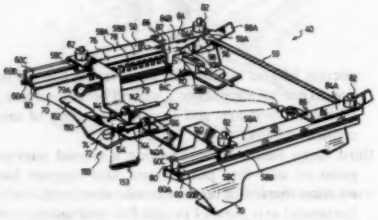
Dukecal J. Harding, Markham, Canada, assignor to Magna International Inc., Markham, Canada

Filed Feb. 21, 1986, Ser. No. 831,528

Claims priority, application Canada, Jun. 18, 1985, 484400

Int. Cl.[4] B60N *1/02*

U.S. Cl. 297—341 **52 Claims**



1. A comfort adjustment manual override seat track assembly suitable for securing a seat to the floor of a vehicle to permit the seat's position to be adjusted relative to the front of the vehicle and permit the seat to be moved from that adjusted position towards the front of the vehicle to permit maximum access to behind the seat and to be returned to that adjusted position, the assembly comprising:

(a) a pair of laterally spaced tracks and supports therefor for being secured to the vehicle, at least one of the tracks and supports carrying a plurality of apertures along its length;

(b) a fastener slideably secured to at least one of the track and associated supports carrying the plurality of apertures for slideable movement relative thereto and for being removeably secured thereto by extending into at least one aperture precluding longitudinal movement with respect to the track and associated support of the fastener until deliberately disengaged therefrom;

(c) means to engage and disengage each such fastener from the at least one aperture of the track and associated supports;

(d) a slide secured to each track and support to which each fastener is slideably secured for relatively longitudinal movement with respect thereto and for being secured to the bottom of the seat, each slide carrying a depending trap, the trap comprising a pair of spaced walls, a forward wall and a rear wall, the forward wall being closest to the front of the vehicle in which the assembly is mounted and being fixed relative to the slide and the rearward wall being displaceable from a normally trapping position with the front wall to trap the associated fastener between the walls, to a position whereat the rearward wall of the trap does not trap the fastener to permit the slide to travel forward, the motion of the displacement of the rearward wall of the trap being in a plane parallel to the direction of movement of the slide, the rearward wall sloped in such a manner to permit the fastener to be wedged between the forward and rearward walls when trapped, yet provides sufficient clearance to permit the wall to move to the position whereat the rearward wall of the trap does not trap the fastener to permit the slide to slide forwardly; and

(e) means to maintain the rearward wall in normally trapping position to trap the fastener between the spaced forward and rearward walls until the rearward wall is displaced to a position at which it does not trap the fastener thus permitting the slide to travel forwardly.

4,707,031

HEAD RESTRAINT

Robert F. Meistrell, 413 Via Pasqual, Redondo Beach, Calif. 90277

Continuation of Ser. No. 605,173, Apr. 30, 1984, abandoned. This application Jul. 7, 1986, Ser. No. 882,746

Int. Cl.[4] A47C *7/38;* **B60R** *22/00*

U.S. Cl. 297—393 **1 Claim**

1. In a head support for a traveler sitting in a chair having a headrest, and including said headrest, the combination comprising

(a) a first band adapted to be fitted in adjustably wrapped condition closely about the user's head and at eye or forehead level,

(b) band retention means associated with said band for retaining the band in said wrapped condition, and

(c) head restraint means coupled to said band and adapted to be coupled to said headrest for restraining the user's head against lateral side-to-side movement relative to the headrest,

(d) said head restraint means comprising a second band attached to said headrest so that a portion of the second band extends laterally at the front of the headrest, and auxiliary means interconnecting said first and second bands at laterally spaced locations, said auxiliary means comprising hook and pile pad elements associated with said front portions of the second band and said rear portion of the first band,

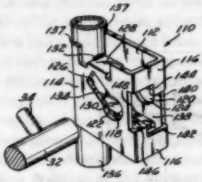
(e) a flap carried by the headrest and associated with said second band, and having a down position to frontwardly cover substantial portions of the second band when user's head restraint is not desired, and also having an up-position to expose the second band and to enable releasable interconnection of said hook and pile pad elements when user's head restraint is desired,

(f) said second band and said hook and pile pad elements thereon extending forwardly at laterally opposite sides of said first band when wrapped about the user's head.

4,707,032
ARMREST SUPPORT BRACKET FOR A RECLINING SEAT

Chung L. Chang, 14335 Rimford Pl., Diamond Bar, Calif. 91765

Filed Jan. 28, 1987, Ser. No. 8,387
Int. Cl.[4] A47C 7/54
U.S. Cl. 297—416 **19 Claims**



1. Apparatus comprising:

a seat back frame for a reclining seat;

a U-shaped bracket having an outside plate, an inside plate oriented parallel to the outside plate, and a front plate perpendicular to said parallel plates and secured to one end of each of the parallel plates;

said parallel plates having aligned circular openings, the opening in the outside plate having a notch extending at an angle upwardly and rearwardly from the circular opening to form a keyhole-like opening, a tab extending in from the upper portion of the outside flat plate, the bracket connected to the seat back frame member at the rear of the tab and at the open edges of the bracket;

an opening in the front plate having a lower stepped edge with a higher level step adjacent the outside plate and a lower level step adjacent the inside plate;

a tab extending inwardly from the bottom edge of the inside plate; and

an armrest support member having a rectangular plate with a cylindrical rod extending from one side and adjacent one end of said plate, said cylindrical rod having a laterally-extending pin, said rod adapted to fit into the openings in the outside and inside plates and to allow rotating movement, the notch in the outside plate opening allows passage of the pin through the plate when the pin is aligned with the notch, said bracket providing three abutments for said pin which place said armrest support member at three angular positions with respect to the seat back frame, a stow-away position wherein the armrest support plate is generally parallel to the seat back frame, a middle position wherein the armrest support plate is at slightly less than 90° with respect to the seat back frame and a lower position wherein the armrest support plate is at an acute angle with the seat back frame.

4,707,033
DEVICE FOR RELEASABLY CONNECTING A SEAT PORTION TO THE VEHICLE BODY

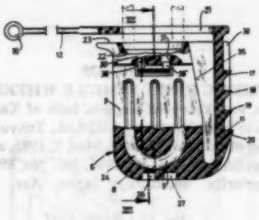
Karl Stenz, Wiesbaden, and Horst Baltes, Florsheim, both of Fed. Rep. of Germany, assignors to General Motors Corporation, Detroit, Mich.

Filed Jul. 7, 1986, Ser. No. 882,964
Claims priority, application Fed. Rep. of Germany, Jul. 30, 1985, 3527246
Int. Cl.[4] A47C 7/02
U.S. Cl. 297—452 **7 Claims**

1. A device for releasably mounting the downward depending U-shaped bent portion of a wire seat frame on the apertured floor pan of a vehicle body, comprising:

a pair of molded plastic half members having surfaces adapted for interengagement with one another and defining a mating groove configuration therebetween providing a U-shaped upwardly opening groove for enclosing the downwardly depending U-shaped bent portion of the wire seat frame therebetween when interengaged together,

said half members having means acting therebetween to retain the half members in enclosure of the U-shaped bent portion of the seat frame,

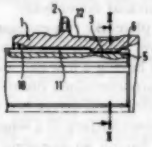


and a locking pawl integrally molded with one of the half members and adapted upon insertion of the half members and bent wire portion of the seat frame into the aperture of the floor pan to engage with the floor pan and retain the seat frame on the vehicle body.

4,707,034
HUB SLEEVE FOR A BICYCLE HUB

Richard Gerstner, Dittelbrunn; Günter Look, Grafenrheinfeld; Werner Seybold, Gädheim, and Werner Stener, Schweinfurt, all of Fed. Rep. of Germany, assignors to Fichtel & Sachs AG, Fed. Rep. of Germany

Filed Nov. 25, 1985, Ser. No. 801,453
Claims priority, application Fed. Rep. of Germany, Nov. 24, 1984, 3442873
Int. Cl.[4] B60B 27/00, 1/02
U.S. Cl. 301—6 V **5 Claims**



1. A hub sleeve for a bicycle hub comprising a main hub sleeve member (1) with an axis, a radially inward face (11) having a radially inner profile line and a radially outward face (12) having a radially outer profile line,

at least one of said radially inner profile line and said radially outer profile line having deviations from a straight line such as to define longitudinal sections (S_1, S_2, S_3) of said main hub sleeve member (1) with differences in wall thickness,

ball bearing faces (10) and at least one circular arrangement of torque transmission teeth (3) being integrally formed with said main hub sleeve member (1) at said radially inward face (11),

said torque transmission teeth (3) being formed by radially inward dislocations of material of said main hub sleeve member (1),

said circular arrangement of torque transmission teeth (3) being provided in a longitudinal section (S_1) having an inner diameter larger than the minimum inner diameter of said main hub sleeve member (1),

said circular arrangement of torque transmission teeth (3) being axially adjacent to a conical pawl control face (1*a*) diverging axially towards said circular arrangement of torque transmission teeth (3) and having a large diameter substantially corresponding to the inner diameter of said

main hub sleeve member (1) in the longitudinal section (S_1) accommodating said circular arrangement of torque transmission teeth (3) and a small diameter smaller than the inner diameter of said main hub sleeve member (1) in the longitudinal section (S_3) accommodating said circular arrangement of torque transmission teeth (3).

4,707,035

SYNTHETIC RESIN VEHICLE WHEEL COVER

Isao Kondo, and Yasuyuki Koguro, both of Kanagawa, Japan, assignors to Marui Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 706,887, Mar. 1, 1985, abandoned. This application Aug. 12, 1986, Ser. No. 894,391

Claims priority, application Japan, Apr. 14, 1984, 59-54127[U]

Int. Cl.[4] B60B 7/02

U.S. Cl. 301—37 P 1 Claim

1. A synthetic resin wheel cover comprising:

a generally circular cover body;

a plurality of plate-like rim-engaging projections on the face of said cover body which is to be against a wheel, said projections having a free end and being circumferentially spaced at predetermined distances and integral with and extending from said cover body for elastically engaging the radial inner surface of a wheel rim, each rim-engaging projection having an engaging portion on the free end thereof projecting radially outwardly of said cover body for engaging a corresponding recess in the radial inner surfaces of the wheel rim for preventing said rim-engaging projection from being easily removed from the wheel rim; and

at least two nut gripping members on the same face of said cover body as said projections, each consisting of a cylindrical projection integral with said cover body and having a hollow interior and extending from said cover body for engaging with nuts on the wheel, each of said cylindrical projections being resiliently deformable radially outwardly by the nuts as the hollow interior of said cylindrical projection is fitted over the nut and being adapted to clamp the nut by the resilient force of the cylindrical projection, each of said cylindrical projections having an annular bulge at the end remote from said cover body and extending into the hollow interior of said cylindrical projection for preventing said cylindrical projection from being easily removed from the nut, said cover body, said plate-like rim-engaging projection and said cylindrical projections being molded of synthetic resin having sufficient resiliency to provide a spring back force of said rim-engaging projections and said cylindrical projections sufficient to cause the projections to firmly engage with the wheel rim and the nuts so as not to come off the wheel.

4,707,036

BRAKE PRESSURE REDUCING VALVE

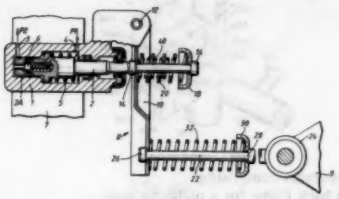
Glyn P. R. Farr, Leek Wooton, England, assignor to Lucas Industries Public Limited Company, Birmingham, England

Filed Jul. 22, 1986, Ser. No. 888,121

Claims priority, application United Kingdom, Jul. 24, 1985, 8518706

Int. Cl.[4] B60T 8/18, 13/00

U.S. Cl. 303—6 C 9 Claims



1. In a load conscious brake pressure reducing valve assembly comprising: a valve body (1) having an inlet (4) and an outlet (3); a valve (6) for controlling communication between the inlet (4) and the outlet (3); a piston (2A) mounted in the body for controlling the opening and closing of the valve (6), the piston (2A) being movable between a normal position in which the valve (6) is open to provide communication between the inlet (4) and the outlet (3) and a closed position in which the valve (6) is closed and said communication is interrupted; a piston rod (2) attached to the piston (2A) and protruding from the body; a bias spring (5) urging the piston (2A) with a predetermined force towards its normal position, the invention comprising a position sensing device (8) which senses the relative positions of the sprung (7) and unsprung (9) parts of a vehicle and includes force transmitting means (10) separately connected to said piston rod (2) separately from said bias spring, said force transmitting means (10) being constructed and arranged that in a first preselected nominal separation of the sprung part (7) relative to the unsprung part (9) the force transmitting means (10) applies substantially no force to said piston rod (2) so that substantially the only force exerted on said piston (2A) is said predetermined force of said bias spring (5), but when the distance between said parts (7,9) is greater than said nominal separation the force transmitting means (10) exerts a force on said piston rod (2) opposing the force exerted on said piston (2A) by said bias spring (5) and when the distance between said parts (7,9) is less than said nominal separation the force transmitting means (10) exerts a force on said piston rod (2) enhancing the force exerted on said piston by said bias spring (5).

4,707,037

LOAD-DEPENDENT BRAKE PRESSURE REGULATOR

Eckhart Rüdiger, Ebern, Fed. Rep. of Germany, assignor to FAG Kugelfischer Georg Schafer (KGaA), Fed. Rep. of Germany

Filed Dec. 18, 1985, Ser. No. 810,645

Claims priority, application Fed. Rep. of Germany, Dec. 19, 1984, 3446270

Int. Cl.[4] B60T 8/18

U.S. Cl. 303—22 R 11 Claims

1. A load-distribution-dependent hydraulic brake pressure regulator for a vehicle, comprising:

(a) housing means;

(b) receiving means in the housing means for receiving pressurized hydraulic fluid from a master cylinder;

(c) transmitting means in the housing means for transmitting pressurized hydraulic fluid to a brake line;

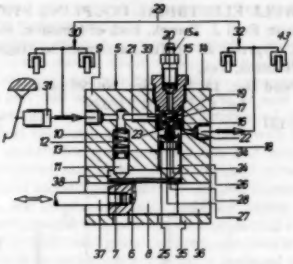
(d) valve means for controllably intercommunicating the receiving means and the transmitting means to control the pressure of such transmitted hydraulic fluid;

(e) actuating piston means for receiving pressurized fluid from the receiving means and generating a first force in response thereto;

(f) balance beam means including a spring beam and a support, said support providing an extended support surface which extends along the length of said spring beam to provide a variable fulcrum point for the spring beam, the location of said fulcrum point varying continuously along the length of the spring beam according to the magnitude of such first force, said balance beam means receiving such first force and generating in response a second force;

(g) control piston means for receiving such second force and transmitting such second force to the valve means for controlling the same; and

(h) adjustment means for receiving information indicative of the vehicle load distribution and automatically changing the relative position of the support with respect to the length of the spring beam in response to said information, such that such second force is related to such first force and to such vehicle load distribution according to a predetermined function corresponding to a degressive curve, wherein said function provides that said brake line pressure will increase as a function of said pressure in said master cylinder, but with a rate of increase of brake line pressure which continuously decreases as said master cylinder pressure increases, the spring beam and the support surface being shaped to determine the predetermined function.



11. A load-distribution-dependent hydraulic brake pressure regulator for a vehicle, comprising:

(a) actuating piston means for receiving an input brake pressure and in response generating a first force;

(b) balance beam means including a spring beam and a support, said support providing an extended support surface which extends along the length of said spring beam to provide a variable fulcrum point for the spring beam, the location of said fulcrum point varying continuously along the length of the spring beam according to the magnitude of such first force, said balance beam means being adjustable by changing the relative position of the support with respect to the length of the spring beam in response to the vehicle load distribution, for receiving such first force and in response generating a second force, said second force being related to such vehicle load distribution according to a predetermined function corresponding to a degressive curve, the spring beam and the support being shaped to determine the predetermined function; and

(c) control piston means for receiving such second force and in response generating an output brake pressure,

(d) wherein said function provides that said output brake pressure will increase as a function of said input brake pressure, but with a rate of increase of brake line pressure which decreases as said input brake pressure increases.

4,707,038

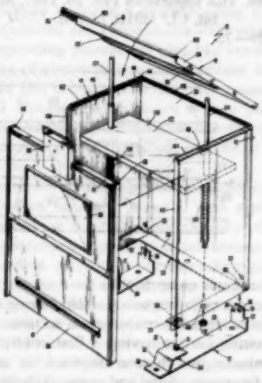
DISPLAY RACK

Ronald C. Voegeli, 918 Gibbs Rd., Venice, Fla. 33595

Filed Jan. 8, 1986, Ser. No. 817,087

Int. Cl.[4] B65H *1/04*

U.S. Cl. 312—257 SM **1 Claim**



1. A knock-down display rack for publications such as newspapers comprising:

a pair of base legs supportable on the ground and each including

a horizontal ledge spaced above the ground at a front end of said base leg, and

an upstanding flange at a rear end of said base leg, said flange defining an upstanding tongue,

a housing comprising a sheet of material bent along two vertical corners to define a U-shaped wall member comprised of a pair of parallel upright side walls and a rear wall therebetween,

front vertical edges of said side walls being bent out of the plane of the remainder of said side walls,

lower horizontal edges of said side and rear walls being bent inwardly to form horizontal side and rear flanges, with front ends of said side flanges resting on said ledges, and rear ends of said side flanges having slots sized to receive said upstanding tabs,

fastener means for securing said ledges to said side flanges and for securing said tabs to said rear wall,

a front unit comprising a frame and a door swingably mounted thereto, said frame including

a lower edge bent inwardly to form a horizontal flange resting on said ledges,

a pair of upright edges bent to form rearwardly open channels which receive said bent front edges of said side edges in a manner causing a deformation of said bent edges to effect a friction-fit, and

an upper edge bent hoirzontally forwardly,

a cover mounted atop said housing and frame, said cover including

a plurality of donwardly bent peripheral edges forming two side flanges and a rear flange, which flanges bear against outside faces of said side and rear walls, respectively, and

a front edge bent rearwardly to form a rearwardly open hoirzontal channel which receives said upper edge of said frame,

a plurality of rods extending between, and coupled to, said base legs and said cover to draw said cover and base legs toward one another, and

a shelf slidably mounted on for up-and-down movement, said rods and spring biased upwardly.

4,707,039

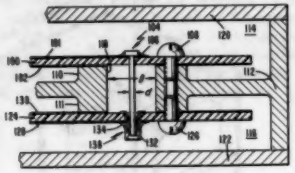
COAXIAL CONNECTOR FOR CONTROLLED IMPEDANCE TRANSMISSION LINES

Charles K. Whipple, Mukilteo, Wash., assignor to John Fluke Mfg. Co., Inc., Everett, Wash.

Continuation of Ser. No. 846,517, Mar. 31, 1986, abandoned, which is a continuation of Ser. No. 599,077, Apr. 11, 1984, abandoned. This application Feb. 26, 1987, Ser. No. 20,191

Int. Cl.[4] H01R *13/648, 17/04*

U.S. Cl. 439—75 **11 Claims**



11. A connector comprising:

a conductive radio frequency shield having a hole provided therein of a predetermined cross section;

a first wiring carrier having a first controlled impedance transmission line thereon disposed on one side of said radio frequency shield and engaged therewith;

a conductive projection extending from said first wiring board perpendicular thereto and in conductive contact with said first controlled impedance transmission line, said projection extending through said hole and encircled by said hole along substantially all of the extension thereof, said projection having a predetermined cross section smaller than said predetermined diameter of said hole in said radio frequency shield whereby said projection is conductively isolated from said shield;

a second wiring carrier having a second controlled impedance transmission line thereon, said second wiring carrier disposed on the opposite side of said radio frequency shield from said first wiring carrier; and

engagement means disposed on said second wiring carrier and in conductive contact with said second controlled impedance transmission line, said engagement means engageable with said projection to conductively connect said first and second controlled impedance transmission lines.

4,707,040

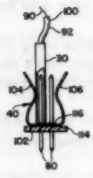
CONNECTOR FOR COAXIALLY SHIELDED CABLE

George A. Hansel, III, Newark, Del., assignor to W. L. Gore & Associates, Inc., Newark, Del.

Continuation of Ser. No. 512,754, Jul. 11, 1983, abandoned, which is a continuation-in-part of Ser. No. 295,824, Aug. 24, 1981. This application Jul. 26, 1985, Ser. No. 758,853

Int. Cl.[4] H01R *31/08*

U.S. Cl. 439—510 **8 Claims**



1. A connector structure for connecting a plurality of coaxial cables to a standard array of non-coaxial male contacts, said connector structure comprising:

(a) a female connector for each said coaxial cable comprising:

(1) an inner contact having a first end compatible with each of said male contacts and an axially-spaced second end electrically and mechanically connected to the inner conductor of said coaxial cable;

(2) an electrically insulating element coaxially surrounding said inner contact; and

(3) an outer contact having a rectangular cross-section and coaxially surrounding said insulating element, said outer contact coaxially extending between the first and second ends of said inner contact and being ®1 ®ctrically and mechanically connected to the outer conductor of said coaxial cable proximate the second end of the inner contact;

(b) an auxiliary contact comprising a connector element separable from each of said outer contacts and having a plurality of mechanically and electrically interconnected surfaces, said surfaces being spaced from said male contacts and at least one said surface being disposed adjacent each said male contact for resilient friction-fit type mechanical and electrical connection with a portion of said outer contact when said adjacent male contact is received in said inner contact; and

(c) means for electrically and mechanically connecting said auxiliary contact to at least one of said male contacts thereby electrically connecting the outer conductors of all said coaxial cables to said one male contact.

4,707,041

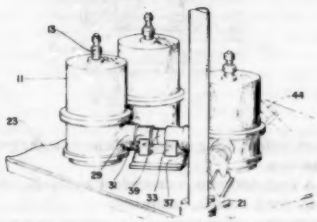
SUBSEA WELL ELECTRICAL COUPLING SYSTEM

Sheldon L. Kovit; Emil J. Tousek, both of Houston, and Larry D. Douglas, Cypress, all of Tex., assignors to Hughes Tool Company, Houston, Tex.

Filed Dec. 15, 1986, Ser. No. 941,476

Int. Cl.[4] H01R *13/629*

U.S. Cl. 439—131 **7 Claims**



1. In a subsea well assembly of the type having a plurality of hydraulic and electrical control modules of the type that are lowered from the surface and latched into receptacles located on a platform on the subsea well assembly, an improved means in each module for transmitting electricity from one module to another, comprising in combination:

an electrical housing extending laterally outward from the module and having at least one electrical coupling on its outer end for engagement with an electrical coupling of an adjacent module;

mounting means for mounting the electrical housing to the module for vertical and horizontal flexible movement relative to the module;

guide means located on the platform adjacent the receptacle for receiving the electrical housing of the module as the module locates in the receptacle, and for orienting the electrical housings of adjacent modules toward each other;

a latch rod extending into the module and being vertically reciprocable for latching the module into its receptacle; and

linkage means connected between the latch rod and the electrical housing in the module for moving the electrical housing outward from the module for engagement with an electrical housing of an adjacent module in response to vertical movement of the latch rod.

4,707,042

ELECTRICAL SOCKET APPARATUS

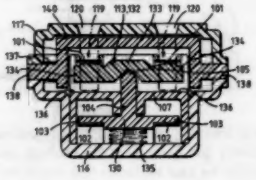
John D. Haden, Rugeley, England, assignor to D.H. Haden Limited, West Midlands, England

Filed Jan. 15, 1986, Ser. No. 819,148

Claims priority, application United Kingdom, Feb. 5, 1985, 8502909; Aug. 3, 1985, 8519552

Int. Cl.[4] H01R *13/44*

U.S. Cl. 439—140 **14 Claims**



1. An electrical apparatus which comprises:

an electrical appliance which is provided with a first and a second guide surface, and with at least live and neutral terminal pins located between said first and said second guide surfaces; and

an appliance support apparatus which is provided with a first and a second guide surface, with said first and said second guide surfaces being slidably engageable with said first and said second guide surfaces of said appliance to locate said appliance in a predetermined position; said support apparatus also being provided with live and neutral sockets for receiving said live and neutral terminal pins therein, said sockets being disposed between said first and said second guide surfaces of said support apparatus; electrical conductors being disposed within each of said sockets; switch means being located on said support apparatus between said guide surfaces, said switch means being actuable by said appliance when it is placed in a predetermined position, thereby making an electrical connection to at least one of said electrical conductors; and with said support apparatus further including a displaceable member which projects into said sockets and is movable against a bias to actuate said switch means.

4,707,043

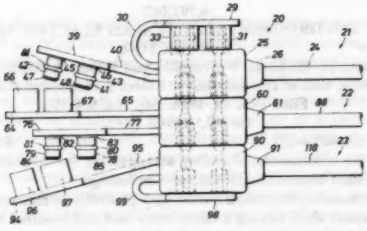
ELECTRICAL CONNECTOR

Charlie C. Reed, 3206 Elegia Dr., Houston, Tex. 77080

Filed Nov. 3, 1986, Ser. No. 925,962

Int. Cl.[4] H01R *13/44*

U.S. Cl. 439—142 **20 Claims**



1. An improved junction assembly for detachably interconnecting a plurality of electrical components to a seismic exploration network or other electrical system located in a deleterious environment, comprising

a first substantially rectangular body member formed of a water-impervious insulating material with a plurality of sidewall recesses, a correspondingly plurality of plug-like extensions projecting oppositely of said recesses, a first strap-like portion carrying a corresponding plurality of cap-like projections, and a second strap-like portion carrying a corresponding plurality of plug-like extensions,

a first plurality of electrical terminal members fixedly disposed in said first body member for interconnection with one of said components and each with a pin-like end portion projecting into one of said recesses and a socket-like opposite end portion extending into one of said plug-like extensions,

a second substantially rectangular body member formed of a water-impervious insulating material with a plurality of sidewall recesses, a corresponding plurality of plug-like extensions projecting oppositely of said recesses, a third strap-like portion carrying a corresponding plurality of cap-like projections, and a fourth strap-like portion carrying a corresponding plurality of plug-like extensions, and

a second plurality of electrical terminal members fixedly disposed in said second body member for interconnection with another different one of said components and each with a pin-like end portion projecting into one of said recesses and a socket-like opposite end portion extending into one of said plug-like extensions,

said second body member being positioned abuttably against said first body member with said plug-like extensions projecting from said second body member inserted into corresponding sidewall recesses in said first body member and with the pin-like end portions of the terminals in the sidewall recesses in said first body member being inserted into the socket-like end portions of the terminals in corresponding ones of said plug-like extensions projecting from said second body member.

4,707,044

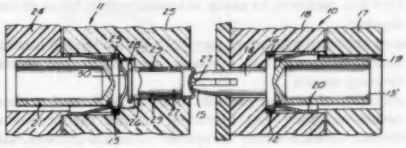
BUTT CONTACTS FOR AN ELECTRICAL CONNECTOR

Edgar Burns, Los Angeles, Calif., assignor to G & H Technology, Inc., Santa Monica, Calif.

Filed Jul. 28, 1986, Ser. No. 889,943

Int. Cl.[4] H01R *25/00*

U.S. Cl. 439—289 **6 Claims**



1. A contact for use in an electrical connector, comprising:

a generally cylindrical body having an enlarged circular flange, a hollow tubular portion extending from one face of the flange, and a pin extending from the opposite flange face;

a metal sleeve having a side wall, a closed end and an open end received upon the pin, the side wall of said sleeve being deformed inwardly at least at one point to such an extent as to provide sliding contact between the sleeve and pin; and

compression spring means received on said pin contacting the flange and the sleeve.

4,707,045

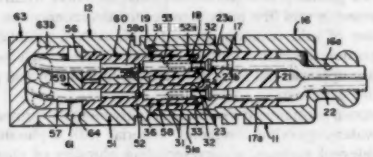
SHIELDED MICROMINIATURE MULTI-PIN CONNECTOR

Reuben E. Ney, Mount Joy, and Bryon L. Walters, Camp Hill, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 798,644, Nov. 15, 1985, abandoned. This application Dec. 5, 1986, Ser. No. 939,305

Int. Cl.[4] H01R *13/52*

U.S. Cl. 439—588 **6 Claims**



1. A microminiature, high-voltage, multi-pin connector comprising:

first and second housing means, said second housing means being integrally formed with a transverse wall having a plurality of passageways extending therethrough, each of said passageways having an essentially constant diameter;

a first connector portion disposed in said first housing means, said first connector portion including a relatively resilient connector body having a plurality of cylindrical cavities therein, each of said cylindrical cavities including a peripheral surface and a base surface and having a pin terminal extending substantially axially into said cavity from said base surface, said pin terminal being terminated on a first insulated electrical conductor;

a second connector portion disposed in said second housing means and adapted to be connected to said first connector portion, said second connector portion, including a plurality of separate, relatively rigid, cylindrical members disposed in said passageways and positioned to extend into said plurality of cavities when said first and second connector portions are connected, each of said plurality of cylindrical members containing a socket terminal terminated to a second insulated electrical conductor, said socket terminals being matable with said pin terminals in said cavities when said cylindrical members extend into said cavities, the cylindrical members including an outer peripheral surface and an extended end surface, said second connector portion further including a separate retaining member for retaining one end of said plurality of separate cylindrical members and a portion of said second insulated electrical conductors while permitting said cylindrical members to move independently relative to one another;

means provided by a cover member and said second housing means to secure said retaining member in said second housing means;

a plurality of sealing portions integral with said resilient connector body and extending around the peripheral surface of each cavity at spaced locations thereon, said plurality of sealing portions comprising radial seals to be compressed by said cylindrical members upon insertion of said cylindrical members into said cavities to act as barriers in the air gaps between the outer peripheral surfaces of said cylindrical members and the peripheral surfaces of said cavities, said sealing portions functioning as O-rings; and

an axial compression seal integral with said resilient connector body and extending upwardly from the base surface of each cavity, each axial compression seal comprising an annular raised portion of said resilient connector body surrounding a portion of said pin terminal to be compressed by said cylindrical members upon insertion of said cylindrical members into said cavities to act as a barrier in the air gaps between the extended end surfaces of said cylindrical members and the base surfaces of said cavities.

4,707,046

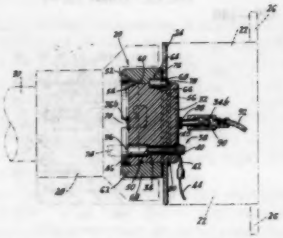
SAFETY BREAKAWAY ELECTRICAL CONNECTOR CONSTRUCTION

Theodore L. Strand, Safety Harbor, Fla., assignor to Liquidometer Corporation, Tampa, Fla.

Filed Jul. 10, 1986, Ser. No. 884,034

Int. Cl.[4] H01R *13/633*

U.S. Cl. 439—314 **18 Claims**



1. A safety breakaway electrical connector construction for a tank truck or carrier vehicle, comprising in combination:

(a) a housing means having an opening in one wall,

(b) an electrical receptacle having circuit means, said receptacle being mounted in said wall opening,

(c) said circuit means comprising conductors which are disposed at the inside of said housing means and other conductors which are accessible at the exterior of said housing means,

(d) attachment means carried by said receptacle at the exterior of said housing means, for interlocking engagement with a cooperable electrical plug fitting of a liquid transfer facility to maintain said plug fitting in attached position on the receptacle,

(e) said cooperable plug fitting having conductors adapted for engagement with the said other conductors of the receptacle,

(f) electrical connector means disposed in said housing means and engaged with said first-named conductors to providecircuit paths to and from the circuit means of the receptacle, and

(g) automatic cooperable yieldable detent means on said housing means and receptacle, for normally yieldably retaining the receptacle positioned in said wall opening, said detent means automatically yielding and releasing the receptacle from the housing means in response to excessive abnormal force applied to said attachment means of the receptacle in a direction away from said housing means.

4,707,047

ENVIRONMENTALLY SEALED ELECTRICAL CONNECTOR

Leonard H. Michaels, Warrenville, and Robert A. Miller, Woodridge, both of Ill., assignors to Molex Incorporated, Lisle, Ill.

Filed Feb. 19, 1986, Ser. No. 830,796

Int. Cl.[4] H01R *13/52*

U.S. Cl. 439—271 **4 Claims**

1. An environmental sealing arrangement for a backshell to frontshell connection of the type including:

a connector frontshell including a generally cylindrical rigid outer shell having a cable entry end and external threads adjacent said cable entry end;

a backshell including a generally rigid outer shell with a coupling portion including internal threads adapted to

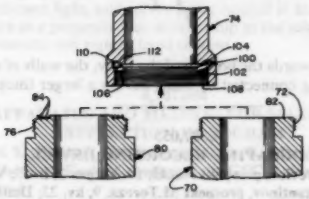
threadingly engage the external threads on the frontshell; and

sealing means disposed in said coupling portion for engaging the cable entry end to provide an environmental seal between the frontshell and backshell,

the improvement in said sealing means comprising:

a ring-like resilient gasket of rectangular cross-section elongated in a radial direction;

the backshell including a shoulder radially inward of said internal threads disposed adjacent the coupling portion having a mating surface facing the frontshell cable end



and engageable with radially inner portions of said gasket; and a recess formed in said coupling portion radially positioned between said shoulder and an external wall of said backshell, said recess extending axially on both sides of said shoulder surface for receiving and supporting radially outer portions of the gasket;

whereby the shoulder and the recess cooperate with radially inner and radially outer portions of said gasket, respectively, to provide environmental sealing with a variety of frontshells having differing cable entry end configurations.

4,707,048

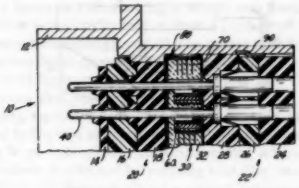
ELECTRICAL CONNECTOR HAVING MEANS FOR PROTECTING TERMINALS FROM TRANSIENT VOLTAGES

Edward R. Gliha, Bainbridge, and Leonard A. Krantz, Jr., Sidney, both of N.Y., assignors to Amphenol Corporation, Wallingford, Conn.

Filed Nov. 3, 1986, Ser. No. 926,929

Int. Cl.[4] H01R *13/66*

U.S. Cl. 439—620 **6 Claims**



1. An electrical connector assembly comprising a conductive shell carrying therewithin a dielectric substrate having an array of passages extending therethrough, a terminal disposed within each passage, the grounding means for electrically grounding the terminal to the shell, the connector assembly is characterized in that each passage terminates in a laterally offset cavity wherein one endwall thereof is conductively plated, and voltage limiting means seated in said cavity and in electrical circuit relation to the grounding means and the terminal for limiting voltages received by the terminal to a predetermined value, the voltage limiting means comprising a circuit component in electrical circuit relation to the terminal and the endwall, each said terminal having its own distinct voltage limiting means.

4,707,049

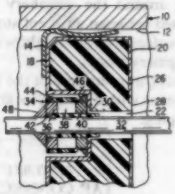
ELECTRICAL CONNECTOR HAVING TRANSIENT PROTECTION

Edward R. Gliha, Bainbridge, N.Y., assignor to Amphenol Corporation, Wallingford, Conn.

Filed Nov. 3, 1986, Ser. No. 927,196

Int. Cl.[4] H01R *13/66*

U.S. Cl. 439—620 **8 Claims**



1. An electrical connector having a metal shell, a dielectric insert having a passage of cylindrical cross-section mounted in said shell, a contact disposed in said passage, and means for grounding the contact to said shell, characterized by

a cylindrical diode mounted in said passage and having a first electrode defining a top face, a second electrode defining a bottom face, a silicon chip sandwiched between the electrodes, and a circular hole extending between its end faces and circumposed around said contact, and

circuit path means for completing a first and a second electrical circuit path, said first electrical circuit path being between the first electrode and the contact and the second electrical circuit path being between the second electrode and the grounding means.

4,707,050

EXTRA LOCKING ELEMENT FOR ROUND PLUGS

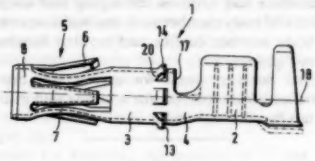
Alfred Konnemann, Wuppertal, Fed. Rep. of Germany, assignor to Grote & Hartmann GmbH & Co. KG, Fed. Rep. of Germany

Continuation of Ser. No. 822,949, Jan. 27, 1986, abandoned, which is a continuation of Ser. No. 567,327, Dec. 30, 1983, abandoned. This application Oct. 9, 1986, Ser. No. 917,437

Claims priority, application Fed. Rep. of Germany, Jan. 28, 1983, 3302824

Int. Cl.[4] H01R *13/40*

U.S. Cl. 439—747 **9 Claims**



1. A round plug intended for retained insertion in a housing, said plug comprising:

a rolled base member including a casing with a cylindrical shape in cross section;

a contact area connected to said casing and extending forwardly toward the front of the plug;

a prong part extending rearwardly from said casing toward the rear of the plug;

stop spring arms in said contact area for engaging a certain part of the housing into which the plug is inserted;

additional locking elements comprising a plurality of fins cut into the casing of the base member rearwardly from said prong part;

said fins having a base end connected to the casing and extending rearwardly from the base end to a cut edge

displaced radially outwardly from the casing, said cut edges of the fins comprising stop surfaces;

said stop surfaces being located on an imaginary plane defined by a circle concentric with the longitudinal axis of the plug and having a diameter larger than the outside diameter of the base member;

said outwardly-displaced stop surfaces being of equal circumferential length and distributed with uniform angular spacing around the periphery base member with gaps interposed between adjacent stop surfaces; and

said stop surfaces being straight with respect to the radius of the imaginary plane,

whereby said stop surfaces of the fins cooperate for locking engagement with a mating locking element in the housing for the plug.

4,707,051

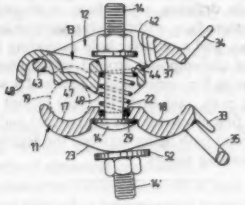
TAP CONNECTOR

Gaddis G. Hall, P.O. Box 835, Trussville, Ala. 35173

Filed Aug. 28, 1986, Ser. No. 901,423

Int. Cl.[4] H01R *4/44*

U.S. Cl. 439—781 **22 Claims**



1. An electrical connector for use with an energized main line and a tap line comprising:

(a) a body member having substantially parallel retaining grooves for receiving said main line and tap line therein;

(b) a cap member having cooperatively formed parallel grooves positioned to hold said main line and tap line in said retaining grooves;

(c) keeper means extending from intermediate said parallel grooves across one of said grooves;

(d) first fastener means extending through said body member intermediate said grooves for urging said keeper means toward said body member such that said keeper means and said body member confine said tap line therebetween in said one groove; and

(e) second fastener means for urging said cap member toward said body member for securing said main line and said tap line therebetween.

4,707,052

TULIP-SHAPED IC SOCKET CONTACT

Jean C. Bouley, Dole, France, assignor to Amphenol Corporation, Wallingford, Conn.

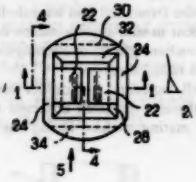
Filed Mar. 11, 1986, Ser. No. 838,634

Claims priority, application France, Mar. 27, 1985, 85 04554

Int. Cl.[4] H01R *9/00*

U.S. Cl. 439—844 **10 Claims**

1. An electrical contact of the tulip type for supporting an integrated circuit or similar component and comprising a tubular body having a closed end forming a bottom, said bottom being connected to a terminal provided to electrically cooperate with a hole of a printed circuit board and an open end of which is provided to receive a leg of said component which cooperates with a spring providing the electrical contact, characterized in that the tubular body is obtained by cold forming and comprises two parallelly extending walls having a small thickness through which are punched two tabs of substantially rectangular shape extending to face one another and



converging towards the bottom of the body, the walls of small thickness being connected by walls having a larger thickness.

4,707,053

HOLOGRAPHIC RECORDING DEVICE

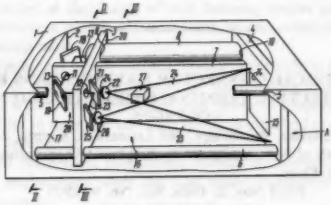
Simkha B. Gurevich, prospekt Nauki, 10, korpus 2, kv. 5; Vladimir B. Konstantinov, prospekt M.Toreza, 9, kv. 22; Dmitry F. Chernykh, ulitsa S.Perovskoi, 3, kv. 28; Vladislav M. Levushkin, ulitsa Kalyaeva, 17, kv. 34; Svetlana A. Pisarevskaya, ulitsa Kronverzkava, 29/37, kv. 109; Mikhail S. Cheberyak, V.O., 8-ya linia, 59, kv. 11, and Alexandr I. Latyshev, Bogatyrsky prospekt, 7, korpus 3, kv. 62, all of Leningrad, U.S.S.R.

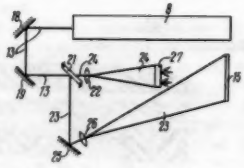
Filed Mar. 13, 1985, Ser. No. 711,374

Claims priority, application U.S.S.R., Apr. 6, 1984, 3715404

Int. Cl.[4] G03H *1/02*; G02B *7/00*

U.S. Cl. 350—3.6 **3 Claims**





1. A holographic recording device comprising:

an acoustical and vibration protection package, said acoustical and vibration protection package comprising:

an enclosure;

at least three supporting elements having openings, spaced apart, and arranged parallel to one another inside said enclosure;

at least two rods arranged parallel to one another and rigidly secured to said supporting elements;

a coherent light source producing a source beam and rigidly secured to at least two of said supporting elements of said acoustical and vibration protection package;

a means for producing reference and object beams, which is rigidly secured to said supporting elements of said acoustical and vibration protection package and is placed in the

path of said source beam, which produces reference and object beams, said object beam being directed to an interposed holographic object, said reference and object beams having a superposition plane;

a holographic recorder positioned in said superposition plane of said reference beam and said object beam;

said openings in said supporting elements of said acoustical and vibration protection package being provided in such shape and number as dictated by the selection of said means for producing said reference and object beams, a screen for protecting the said means for producing reference and object beams, said holographic object and said holographic recorder from the effect of the said source of coherent light, said screen being housed in the said enclosure in a perpendicular relationship to the said supporting elements and rigidly fixed thereto.

4,707,054

APPARATUS AND METHOD FOR MAKING A REFLECTION HOLOGRAM

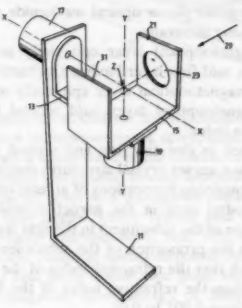
Richard K. Howard, Chatham, and Colin K. Marshall, Gravesend, both of England, assignors to GEC Avionics Limited, England

Filed Feb. 26, 1986, Ser. No. 833,725

Claims priority, application United Kingdom, Mar. 13, 1985, 8506500; Jul. 31, 1985, 8519272

Int. Cl.[4] G03H *1/04*

U.S. Cl. 350—3.65 **14 Claims**



1. A method of making a reflection hologram comprising: directing onto a light sensitive film for transmission through the film a beam of coherent light whose axis passes through a construction point; reflecting at least a portion of the coherent light transmitted through said film to create interference in said film between light directly transmitted through said film and the reflected light; causing said beam and said film to move relatively so that said beam scans said film in a pattern of overlapping narrow bands; and processing said film to form a reflection hologram corresponding to the interference pattern resulting from said relative movement; and wherein said relative movement is effected by rotating said film about a first axis and rotating said first axis about a second axis which intersects said first axis at said construction point.

4,707,055

SCANNING APPARATUS

Richard A. Stark, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 4, 1986, Ser. No. 848,427

Int. Cl.[4] G02B *26/10, 5/04*

U.S. Cl. 350—3.71 **3 Claims**

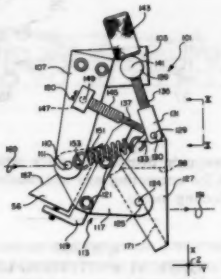
1. Scanning apparatus for scanning a radiation spot along a substantially straight line at a predetermined position on a target, comprising:

a source of coherent radiation having a wavelength λ;

a radial hologon mounted for rotation about an axis and having at least one pattern of parallel grating lines with a pitch d;

means for forming radiation from said source into a collimated beam and for directing said beam onto the hologon at a predetermined incident angle;

a target station for receiving the scanned beam;



lens means between the hologon and the target station for focusing the beam to a spo' at the target station; and

prismatic means between the hologon and the lens means for modifying the cross-sectional shape of the beam;

the wavelength of the radiation and the grating factor

$$\frac{n\lambda}{d}$$

(wherein n is the grating order number) of the hologon being selected to produce a bow in the scanned beam between the hologon and the prismatic means approximately equal and opposite to the bowing tendency imposed by the prismatic means on the scanned beam whereby the scan line at the imaging station is substantially straight;

said prismatic means including first and second prisms so disposed that the beam passes through them in succession, the apexes of said prisms being perpendicular to a plane containing the beam input to said prisms and the beam output from said prisms at mid scan;

an articulated mount carrying said prisms including a first pivot associated with said first prism and a second pivot associated with said second prism, the axes of said pivots being parallel to the apexes of said prisms;

each of said pivots allowing pivoting movement of its associated prism about the axis of the pivot;

first means for adjusting the orientation of the first prism about the first pivot axis to adjust the shape of the line on the target; and

second means for adjusting the orientation of said second prism about the second pivot axis for adjusting the position of the line on the target.

4,707,056

OPTICAL ARRANGEMENT HAVING A CONCAVE MIRROR OR CONCAVE GRATING

Reinhold Bittner, Mögglingen, Fed. Rep. of Germany, assignor to Carl-Zeiss-Stiftung, Heidenheim, Fed. Rep. of Germany

Filed Dec. 12, 1985, Ser. No. 808,291

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1984, 3446726

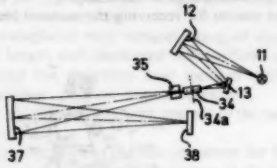
Int. Cl.[4] G02B *6/10*

U.S. Cl. 350—96.12 **13 Claims**

1. An optical arrangement comprising:

light-receiving means having a receiving surface for receiving reflected light thereon;

concave reflecting means for reflecting light from an object surface to form an image thereof on said receiving surface; and,



a slab waveguide disposed directly adjoining one of said surfaces for correcting any astigmatism associated with said reflecting means.

4,707,057

OPTICAL SWITCHING UNIT

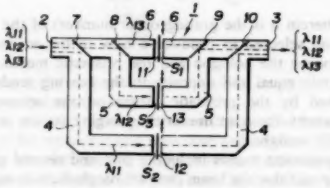
Fumitaka Takahashi, Tokyo; Yoshihiko Kimura; Hideo Tsubata, both of Saitama; Nobuaki Ohji, and Kiyoshi Sashida, both of Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 18, 1984, Ser. No. 631,851

Claims priority, application Japan, Jul. 21, 1983, 58-133130; Feb. 15, 1984, 59-26693

Int. Cl.[4] G02B *6/12*

U.S. Cl. 350—96.12 **12 Claims**



1. An optical switching unit, comprising:

a main light-conductive path having a light inlet for intaking a composite ray of light consisting of a plurality of component rays of predetermined wavelengths from a light source, and a light outlet for outputting said composite ray;

said main light-conductive path having a first gap formed in the route thereof;

said first gap dividing said main light-conductive path;

a first light-shielding member adapted to be actuated by actuation means to be inserted in said first gap in accordance with the state of a first detection object;

a first spectroscopic element for reflecting a component ray of a first predetermined wavelength in said composite ray;

said first spectroscopic element being disposed in said main light-conductive path between said light inlet and said first gap;

said first spectroscopic element having a first reflection wavelength band including said first predetermined wavelength;

a second spectroscopic element for reflecting said component ray of said first predetermined wavelength from said first spectroscopic element toward said light outlet;

said second spectroscopic element being disposed in said main light-conductive path between said light outlet and said first gap;

said second spectroscopic element having the same reflection wavelength band as said second spectroscopic element; and

first light-shielding means for shutting off said component ray from said first spectroscopic element to said second spectroscopic element in accordance with the state of a second detection object.

4,707,058

PLANAR OPTICAL WAVEGUIDE AND PROCESS FOR ITS MANUFACTURE

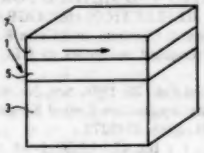
Wolfgang F. M. Tolksdorf, Tornesch; Inske E. H. Bartels, Pinneberg, and Elke B. Pross, Hamburg, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 13, 1985, Ser. No. 775,551

Claims priority, application Fed. Rep. of Germany, Sep. 21, 1984, 3434631

Int. Cl.[4] G02B *6/10*

U.S. Cl. 350—96.12 **15 Claims**



1. A single mode planar optical waveguide comprising:

a nonmagnetic substrate;

a first magnetooptical layer epitaxially arranged on the substrate, said first layer having a refractive index; and

a second magnetooptical layer epitaxially arranged on the first magnetooptical layer, said second layer having a refractive index;

characterized in that the first and second magnetooptical layers have garnet crystal structures containing iron, said layers containing proportions of at least one substituent at dodecahedral sites in the garnet crystal structure, the proportion of the substituent in the first layer being different from the proportion of the substituent in the second layer such that the refractive index of the second layer is greater than the refractive index of the first layer in an amount from 0.001 to 0.01.

4,707,059

INTEGRATED OPTICAL CIRCUIT ELEMENT AND METHOD OF MAKING THE SAME

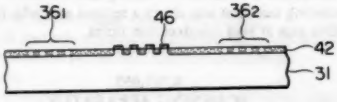
Shigetaro Ogura, Tama, and Yuichi Handa, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 27, 1983, Ser. No. 565,367

Claims priority, application Japan, Dec. 29, 1982, 57-231531

Int. Cl.[4] G02B *6/12*

U.S. Cl. 350—96.13 **5 Claims**



1. An integrated optical circuit element comprising:

a substrate having a surface region;

a waveguide layer formed in said surface region of said substrate and having a refractive index higher than that of said substrate;

a photocoupler which consists of a diffraction grating pattern formed in said waveguide layer and having the same refractive index as that of said substrate, said photocou-

pler being formed by covering a portion of said substrate with a mask of diffraction grating pattern of an electrically conductive material at the time of forming said waveguide layer and afterwards removing the mask; and

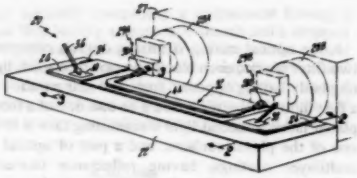
a mounted type electrode for modulating or deflecting light propagated through said waveguide layer and disposed on top of said waveguide layer, said electrode being formed of said electrically conductive material simultaneously with said mask.

4,707,060

BROADBAND INFRARED ELECTRO-OPTIC MODULATOR HAVING A BURIED MICROSTRIP NETWORK

Peter K. Cheo, and Meyer Gilden, both of West Hartford, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Apr. 4, 1985, Ser. No. 720,112
Int. Cl.[4] G02B 6/12
U.S. Cl. 350—96.14 **7 Claims**



1. An electro-optic modulator for modulating an infrared laser signal with a microwave signal, in a system having a laser signal source and a microwave signal source, comprising:

a thin-film optical waveguide, having first and second major surfaces spaced apart at a waveguide thickness, for providing a laser signal guide region and a microwave launcher region therebetween, said first major surface having optical coupling means disposed thereon at opposite ends of said guide region, said guide region providing guided propagation therethrough of laser signals presented from the laser signal source to said coupling means, said second major surface having a metallization layer disposed along that surface portion thereof which is coincident with said guide region;

a microstrip electrode, disposed on said first major surface in register with said guide region, and having launching transformer electrodes at each end thereof, said transformer electrodes being disposed on said first major surface in register with said microwave launcher region, for coupling microwave signals from the microwave signal source to the microstrip electrode; and

metal substrate means, having a substrate surface adapted to receive said waveguide second major surface;

as characterized by

said substrate surface including a channel portion formed therein in register with said microwave launcher region; said modulator further comprising

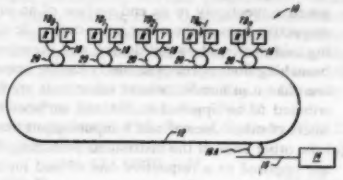
dielectric wafer means, having first and second wafer surfaces spaced apart at a wafer thickness, said second wafer surface having a metallization layer disposed thereon and being bonded along said metallization layer to said substrate channel, said first wafer surface being bonded to said waveguide second major surface in register with said microwave launcher region, whereby said dielectric wafer means provides dissipation of the microwave signal power provided by the microwave signal source to each said launching transformer electrode.

4,707,061

OPTICAL COMMUNICATION SYSTEM EMPLOYING FREQUENCY REFERENCE

Donald H. McMahon, Carlisle, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Oct. 3, 1985, Ser. No. 783,436
Int. Cl.[4] G02B 6/28
U.S. Cl. 350—96.16 **31 Claims**



1. An optical communications system comprising:

an optical communications bus for propagating light signals;

at least two terminal devices coupled to said bus for communication with one another; and

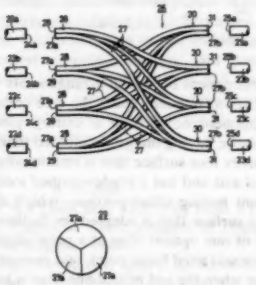
means for introducing a light signal having a predetermined reference wavelength into said bus, said terminal devices including transmission means for generating communication channels fixed in wavelength relative to the predetermined reference wavelength and for introducing information bearing light signals into said bus at the wavelength of at least one of said communication channels.

4,707,062

STAR-SHAPED COUPLER

Hiraku Abe; Minoru Uehara, and Chiaki Aikawa, all of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Japan

Filed Jul. 19, 1984, Ser. No. 632,441
Claims priority, application Japan, Jul. 19, 1983, 58-111001[U]
Int. Cl.[4] G02B 6/28
U.S. Cl. 350—96.16 **3 Claims**



1. In a star-shaped coupler interposed between the end surfaces of a plurality of n output single-core optical fibers and the end surfaces of a plurality of n input single-core optical fibers, each one of said n output fibers being paired with a respective one of said n input fibers and are connected to respective ones of a plurality of n input-output devices which receive and deliver light signals, the coupler acting to distribute a light signal emitted from an output fiber of any one of the input-output devices among the input optical fibers for the other input-output devices,

the improvement wherein:

(a) said star-shaped coupler is comprised of n branching fiber

portions each associated with a respective one of said n input-output devices;

(b) each of said n branching fiber portions consists of a plurality of branching fibers which are less than n in number, wherein the ends of one side of said branching fibers are bound together to form a single-core end surface opposed to the end surface of the output fiber for one of said input-output devices, and the ends on the other side of said branching fibers are distributed so that each is opposed respectively to an end surface of an input fiber of respective ones of the other input-output devices, excluding said one input-output device, and the others of said n branching fiber portions similarly having branching fibers less than n in number whose other ends are likewise distributed to be opposed to the end surfaces of the input fibers of other ones of said n input-output devices; and

(c) the other ends of the distributed branching fibers which are opposed to a respective one of said input fibers are bound together to form a single-core end surface opposed to the end surface of said input fiber.

4,707,063

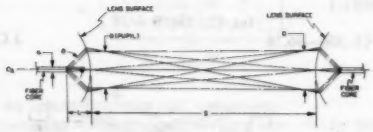
WIDELY SPACED FIBER OPTIC CONNECTOR AND MULTIPLEXER/DEMULTIPLEXER USING SAME

William T. Plummer, Concord, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation of Ser. No. 576,490, Feb. 2, 1984. This application Dec. 4, 1985, Ser. No. 804,522

Int. Cl.[4] G02B *6/32, 6/36;* H04B *9/00*

U.S. Cl. 350—96.18 **14 Claims**



1. A component for use in arrangements with other similar components to optically mate the free ends of optical fibers, said component comprising a unitary piece of transparent optical plastic having integrally molded therein portions defining a convex lens surface that is rotationally symmetric about an optical axis and has a predetermined axial focus point, said component having other portions which define at least one reference surface that is adapted for facilitating mounting the free end of one optical fiber at a point along said optical axis other than said axial focus point, said convex lens surface being operative when the end of said one fiber is located at said other point, to both form an image of said one fiber end and provide, in conjunction with such one fiber's numerical aperture, a component pupil both of which are located finite, but different axial distances, ahead of said convex lens surface, said component thus structured being adapted for use with other components having similar properties which permit them to be used in pairs or groups where they are spaced apart so that the image which each forms of an associated fiber end is on or within the pupil of another whereby light emerging from either fiber end is transferred into the end of the other fiber substantially without loss while permitting said components to be molded with constricted tolerances more relaxed than otherwise possible.

4,707,064

OPTICAL MIXING/DEMIXING DEVICE

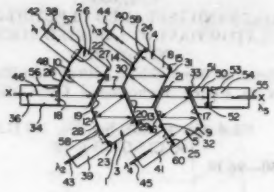
Jerzy A. Dobrowolski, and Elmer H. Hara, both of Ottawa, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Jul. 7, 1986, Ser. No. 882,426

Claims priority, application Canada, Jul. 16, 1985, 486902

Int. Cl.[4] G02B *6/28*

U.S. Cl. 350—96.19 **7 Claims**



1. An optical mixing/demixing device, comprising, at least two filter blocks, each block comprising a solid, light transmitting body having opposed, front and rear parallel, planar faces, a first light transmitting face is to one side of a front one of the planar faces, a second light transmitting face is to other side of one of the planar surfaces, and a pair of optical interference multilayer coatings, having reflectance characteristics for reflectively rebounding light of a particular spectral region therebetween, one being on the front and the other on the rear planar surfaces with the optical interference multilayer coating on the rear planar surface in line with the first light transmitting face and one of the optical interference coatings in line with the second light transmitting face, each pair of optical interference multilayer coatings having different spectral reflectance and spectral transmittance characteristics to those of the other pairs, the blocks being packed side by side, starting from a foremost block, with the first light transmitting faces of each block in line with one another and the first light transmitting face of each following block directly attached to an optical interference multilayer coating of the preceding block, a first lens directly attached to the first light transmitting face and which will expand and collimate a light beam passing therethrough to that face, for each second light transmitting face a second lens directly attached thereto which is similar to the first lens and which will converge a collimated light beam passing therethrough from that face, the blocks being shaped, dimensioned and packed so that when the device is used in the demixing mode a light beam passing through the first lens is expanded and collimated and directed through the first light transmitting face, to traverse the foremost body by the optical interference multilayer coating on the rear planar surface to then reflectably rebound in zigzag fashion between the optical interference multilayer coatings on that block to finally exit from that block through the second light transmitting face and be converged by the second lens, while the remainder of the spectral region of the beam will pass through the optical interference coating on the rear surface of the foremost body to enter the first light transmitting face of the next body where a different spectral region of the beam is reflectively rebounded between the optical interference multilayer coatings in a similar manner, and so on with different spectral regions being reflectively rebounded through each succeeding body, and when the device is used in the mixing mode light beams of different spectral regions are fed by the second lenses into the second light transmitting faces to exit mixed from the first light transmitting face through the first lens.

4,707,065

OPTICAL FIBRE SEALING ASSEMBLY

Peter D. Jenkins, Woodbridge, England, assignor to British Telecommunications, United Kingdom

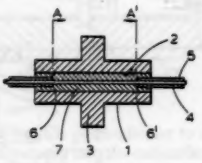
PCT No. PCT/GB84/00126, § 371 Date Dec. 5, 1984, § 102(e) Date Dec. 5, 1984, PCT Pub. No. WO84/04176, PCT Pub. Date Oct. 25, 1984

PCT Filed Apr. 12, 1984, Ser. No. 679,042

Claims priority, application United Kingdom, Apr. 14, 1983, 8310131

Int. Cl.[4] G02B 6/36

U.S. Cl. 350—96.20 17 Claims



1. A sealing assembly comprising a component having a bore, an optical fibre having a protective sheath and a stripped portion from which said sheath has been removed, the optical fibre being disposed in the bore so that the stripped portion and an adjacent portion having said sheath are within the bore and with a first sealant sealing said stripped portion to the bore and a second sealant sealing said adjacent portion to the bore.

4,707,066

GLASS FIBER BUSHING THROUGH A WALL OPENING OF A HOUSING AND METHOD OF MANUFACTURE

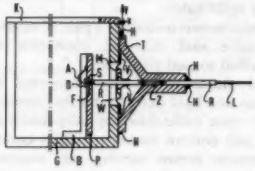
Rudolf Falkenstein, Alzenau; Detlef Haberland, Steinebach; Michael Kaindl, Pfaffenhofen; Helmut Haltenorth, Munich; Herbert Prussas, Reicherthausen, and Franz Taumberger, Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Oct. 11, 1984, Ser. No. 659,892

Claims priority, application Fed. Rep. of Germany, Oct. 12, 1983, 3337131

Int. Cl.[4] G02B 6/36

U.S. Cl. 350—96.20 27 Claims



1. A glass fiber bushing structure, comprising:

a glass fiber including a tip;

a housing including a side wall having a first opening therethrough;

a component mounted in said housing and including an optically-active location facing said opening;

a flexible diaphragm secured to said side wall and covering said first opening, said diaphragm including a second opening therethrough;

a stiff tube surrounding and secured to said glass fiber and including a first end and a second end, said tube extending through said second opening in a tightly-sealed relationship to said diaphragm and positioning said tip adjacent said optically-active location, said tube having its second end external of said housing and, until later fixed, adjustable being to position said tip; and

an adjustment member including a bore closely receiving said tube therethrough, said tube being fixed in said bore in a first coordinate direction, said adjustment member initially movable in second and third coordinate directions to further adjust said tip and then secured to said housing and to said tube.

4,707,067

OPTO-ELECTRONIC MODULE HOUSING

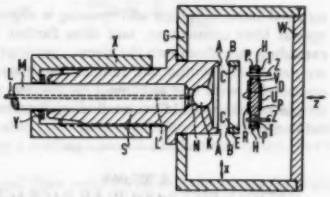
Detlef Haberland, Steinebach; Michael Langenwalter, Stockdorf; Klaus Panzer, Munich; Hans G. Rosen, Hohenschaeftlarn; Lothar Spaeter, Annweiler; Werner Spaeth, Holzkirchen; Bernd Seibert, Ottobrunn, and Helmut Haltenorth, Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Feb. 22, 1985, Ser. No. 704,332

Claims priority, application Fed. Rep. of Germany, Feb. 22, 1984, 3406424; Aug. 8, 1984, 3429282

Int. Cl.[4] G02B 6/36

U.S. Cl. 350—96.20 17 Claims



1. An opto-electronic module housing for positioning an end of an optical fiber in a desired position relative to an active area of an opto-electronic component, said housing including an optical fiber mounting member having an adjustment plane and means for holding an end of an optical fiber with the axis of the fiber extending perpendicular to said adjustment plane with the end being a fixed distance from the adjustment plane; an adjustmetn frame having a wall portion forming a recess, said frame being movable on said adjustment plane in two of three spatial directions to a selected position and being securable to the adjustment plane in the selected position; and positioning means for locating the opto-electronic component in the recess along a third spatial direction relative to the frame and perpendicular to said plane, said positioning means including a plate having the component mounted thereon, said positioning means being securable to the frame, so that said frame and positioning means enabling adjusting the component in the three spatial directions relative to the end of the fiber to obtain an optimum adjustment position.

4,707,068

OPTICAL FIBER WAVEGUIDE CONNECTOR SYSTEM

Norbert L. Moulin, Placentia, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Continuation of Ser. No. 65,032, Aug. 9, 1979, which is a continuation-in-part of Ser. No. 805,500, Jun. 10, 1977, abandoned. This application Apr. 3, 1985, Ser. No. 719,627

Int. Cl.[4] G02B 7/26

U.S. Cl. 350—96.21 11 Claims

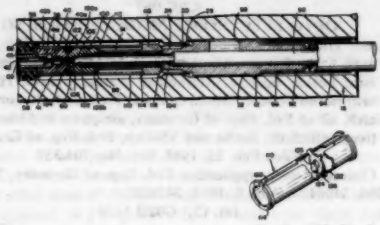
1. A connector for electromagnetically coupling optical fiber conductors together at their termini comprising:

alignment means securely coupled to each of said optical fiber conductors at their termini, with said termini of said optical fiber conductors extending flush with terminal faces of said alignment means, each of said alignment means having a precisely dimensioned periphery for mechanically enlarging each of said termini of said optical fiber conductors;

a longitudinally split sleeve of resilient material having open-

ings therein and a precisely dimensioned interior which is precisely mated to said precisely dimensioned peripheries of said termini alignment means, with the dimension of the sleeve interior being slightly smaller than the peripheral dimensions of said termini alignment means; and

a shim having an opening therein contactable with said



terminal faces, in which said opening is aligned with said optical fiber conductors, said shim further having tabs extending therefrom into the sleeve openings and loosely secured to and within said tubular sleeve and adjustably contactable with said alignment means, and spacing said termini of said optical fiber conductors from mutual physical contact.

4,707,069

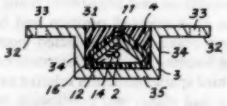
OPTICAL FIBER COUPLER PACKAGING ARRANGEMENT AND A METHOD OF MANUFACTURE THE SAME

Arthur J. Hoffman, III, Roanoke, Va., assignor to U.S. Holding Co., Inc., New York City, N.Y.

Continuation of Ser. No. 416,442, Sep. 10, 1982, abandoned. This application Jan. 17, 1986, Ser. No. 820,914

Int. Cl.[4] G02B *6/38*

U.S. Cl. 350—96.21 **8 Claims**



1. A packaged optical fiber coupler comprising:

a plurality of optical fibers each including jacketed portions separated by a respective unjacketed portion, the unjacketed portions of the fibers being formed of a fragile optical material and being fused together along a length thereof for coupling light from one fiber to another fiber;

a generally trough-shaped support element having open end areas opposite each other, said support element being formed by comprising a pair of side walls interconnected along adjacent elongated edges and spaced apart along the edges opposite the interconnected edges to form an open top area therebetween, said support element being formed of a nickel-iron alloy having about 36% nickel and about 64% iron;

a protective shield formed of a plastic material and extending around the outer surface of each of said side walls and across the open top area between said opposite edges, the interior portions of said trough-shaped support element and said protective shield thereby defining a protected inner area to protect the fused length of said fibers, and

a housing in which said support element is mounted,

the unjacketed portions of said fibers being adhesively secured within the trough formed by the side walls of said support element so that said fibers extend through said open end areas and beyond said support element to support and protect said fused length contained within said protected area from thermal shock,

wherein said housing provides additional protection to said fused region.

4,707,070

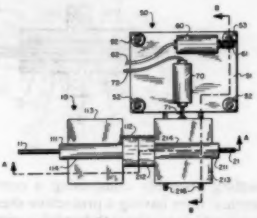
FIBER OPTIC CABLE SPLICING APPARATUS AND METHOD

Roy J. Wagoner, Albuquerque, N. Mex., assignor to GTE Communication Systems, Phoenix, Ariz.

Filed May 28, 1985, Ser. No. 737,982

Int. Cl.[4] G02B *6/38*

U.S. Cl. 350—96.21 **9 Claims**



1. An arrangement for splicing a first fiber optic cable connected to a light source, to a second fiber optic cable, said arrangement comprising:

a fixed connector stage, comprising a generally rectangular fixture having a planar top surface, said top surface having a centrally located and longitudinally oriented channel including first connector means permanently mounted to said fixed connector stage channel, said first connector means having said first fiber optic cable mounted therein;

a movable connector stage, said movable connector stage comprising a generally rectangular fixture having a planar top surface, said top surface having a centrally located and longitudinally oriented channel including second connector means permanently mounted to said movable connector stage channel, said second connector means having said second fiber optic cable mounted therein and said movable connector stage located in close proximity to said fixed connector stage with said first fiber optic cable located along a common horizontal axis with said second fiber optic cable;

alignment means including a pair of mounting pins arranged to have said movable connector stage temporarily mounted to said pins; and

control means electrically connected to said alignment means and light detector means connected to said second fiber optic cable whereby, responsive to said light detector said control means transmits control signals to said alignment means moving said second connector stage relative to said first connector stage until said light detector detects a point of low loss coupling between said first fiber optic cable and said second fiber optic cable.

4,707,071

PLUG PART FOR A RELEASABLE PLUG CONNECTION OF LIGHT WAVEGUIDES

Heinz-Peter Kraft, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 5, 1985, Ser. No. 772,930

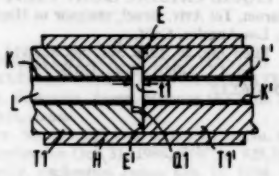
Claims priority, application Fed. Rep. of Germany, Sep. 13, 1984, 3433673

Int. Cl.[4] G02B *7/26*

U.S. Cl. 350—96.21 **10 Claims**

1. In a plug part for a releasable plug connection of light waveguides, said plug part comprising a cylindrical carrier

tube with an optical fiber being centrally fixed therein, said carrier tube having a planar processed end surface extending perpendicular to an axis of the tube, the improvement comprising an end face of the optical fiber being set back by a defined amount relative to the planar processed end surface of the carrier tube, said end face of the optical fiber being a base of a



cross-groove, which extends perpendicular to the axis of the carrier tube and is introduced into the end surface thereof, said cross-groove having a width greater than the outside diameter of the optical fiber and a depth having an amount of approximately $n\text{-}\lambda/2$ wherein n is a whole natural number and λ is the wavelength of light to be conducted by the optical fiber.

4,707,072

AUTO-ALIGNING OPTICAL FIBER CONNECTOR

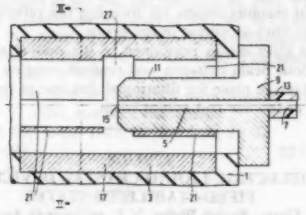
Hillebrand J. J. Kraakman, Eindhoven, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.

Filed Nov. 19, 1985, Ser. No. 799,703

Claims priority, application Netherlands, Dec. 18, 1984, 8403829

Int. Cl.[4] G02B *6/38*

U.S. Cl. 350—96.21 **4 Claims**



1. A connector for coupling at least one pair of optical fibers, each fiber having an end portion accommodated in an envelope, each envelope having a circularly cylindrical outer surface with a diameter, said connector comprising:

a coupling sleeve having a longitudinal axis; and

three leaf springs, each leaf spring having first and second opposite ends, said first ends being secured to the coupling sleeve at locations substantially regularly distributed around the longitudinal axis, each second end being resiliently displaceable in a radial direction with respect to the longitudinal axis, said leaf springs bounding a prism-shaped central cavity having a triangular cross-section through the longitudinal axis, the angles of the triangle all being approximately 60°, said cavity having a diameter equal to a diameter of a circle inscribed therein, the diameter of the cavity being less than the diameters of the envelopes around the optical fibers.

4,707,073

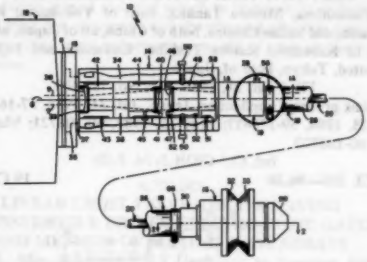
FIBER OPTIC BEAM DELIVERY SYSTEM FOR HIGH-POWER LASER

Robert C. Kocher, San Jose, Calif., assignor to Raytheon Company, Lexington, Mass.

Filed Sep. 4, 1985, Ser. No. 772,590

Int. Cl.[4] G02B *6/34, 6/32*

U.S. Cl. 350—96.23 **19 Claims**



1. In combination:

means for generating a laser beam;

means for focusing the laser beam onto a first end of a fiber optic cable, said focusing means comprising means for applying a cooling agent to the first end of the fiber optic cable;

wherein said fiber optic cable includes means for transmitting the cooling agent coaxially with the fiber optic cable along the length of the fiber optic cable; and

means, disposed at a second end of the fiber optic cable, for receiving the laser beam emergent from the second end of the fiber optic cable and for focusing the emergent laser beam onto a workpiece, said receiving and focusing means including means for applying the transmitted cooling agent to the second end of the fiber optic cable and to the workpiece coaxially with the laser beam.

4,707,074

OPTICAL FIBRE CABLES

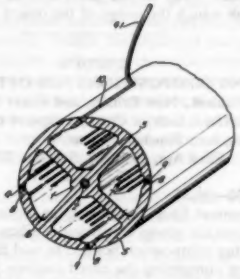
Clifford Heywood, Essex, England, assignor to Telephone Cables Limited, England

Filed Jun. 13, 1985, Ser. No. 744,473

Claims priority, application United Kingdom, Jun. 19, 1984, 8415638; Aug. 24, 1984, 8421480

Int. Cl.[4] G02B *6/44*

U.S. Cl. 350—96.23 **6 Claims**



1. An optical cable including a central core, an outer wall surrounding the core and a plurality of longitudinally extending partitions between the core and the outer wall to define between them a plurality of longitudinally extending channels at least one of which provides accommodation for one or more

optical fibres, comprising: at least one region of reduced thickness formed in said outer wall between two adjacent partitions and extending longitudinally along and over at least one channel thereby forming a line of weakness which facilitates penetration of said outer wall to give access to said at least one channel between said two adjacent partitions.

4,707,075

VERY-LOW-TEMPERATURE FIBERSCOPE

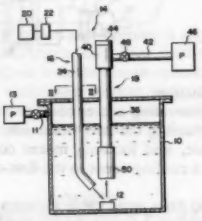
Eiji Fukushima; Minoru Tanaka, both of Yokohama; Kazuo Sanada, and Sadao Chigira, both of Chiba, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki and Fujikura Limited, Tokyo, both of, Japan

Filed Jul. 24, 1985, Ser. No. 758,402

Claims priority, application Japan, Jul. 31, 1984, 57-160582; Aug. 23, 1984, 59-175417; May 21, 1985, 60-108721; May 21, 1985, 60-108723

Int. Cl.[4] G02B *5/14, 6/06*

U.S. Cl. 350—96.26 **19 Claims**



1. A very-low-temperature fiberscope for observing an object placed in a region at a very low temperature, comprising:

a light source;

a light guide extending from the light source to a position near the object in the very-low-temperature region, and adapted to lead light emitted from the light source onto the object;

an image guide having one end located in the vicinity of the object and the other end outside the very-low-temperature region, and adapted to lead an image of the object to the outside of the very-low-temperature region;

an objective lens unit fixed to said one end of the image guide, said objective lens unit including a body tube extending from said one end of the image guide and at least one objective lens arranged in the body tube to face said one end of the image guide and the object and adapted to project the image of the object onto said one end of the image guide, including mean for maintaining the interior of said body tube under vacuum; and

an eyepiece, fixed to the other end of the image guide, through which the image of the object is viewed.

4,707,076

COATING COMPOSITIONS FOR OPTICAL FIBERS

Bolesh J. Skutnik, New Britain, and Harry L. Brielmann, Jr., West Hartford, both of Conn., assignors to Ensign-Bickford Industries, Inc., Simsbury, Conn.

Filed Apr. 12, 1985, Ser. No. 722,828

Int. Cl.[4] G02B *6/16*

U.S. Cl. 350—96.34 **23 Claims**

1. An optical fiber comprising an optical fiber substrate selected from the group consisting of silica, glass and quartz, and a coating composition bonded to said fiber substrate, said composition comprising the cured reaction product of at least one ethylenically unsaturated monoene, an ethylenically unsaturated polyene, and a curing initiator.

13. The optical fiber comprising an optical fiber substrate selected from the group consisting of silica, glass and quartz, and a coating layer bonded to said fiber substrate, said coating layer comprising the cured reaction product of about 10.0 to about 95.0 weight percent of an ethylenically unsaturated monene, about 2.0 to about 70.0 weight percent of an ethylenically unsaturated polyene, and about 0.4 to about 20.0 weight percent of a curing initiator.

4,707,077

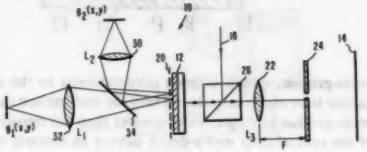
REAL TIME IMAGE SUBTRACTION WITH A SINGLE LIQUID CRYSTAL LIGHT VALVE

Emanuel Marom, Tel Aviv, Israel, assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jan. 30, 1986, Ser. No. 823,913

Int. Cl.[4] G02B *27/46;* G02F *1/13*

U.S. Cl. 350—162.12 **5 Claims**



1. An image subtraction apparatus for subtracting a first and a second input image, comprising:

a liquid crystal light valve having a write side and a readout side;

input means for projecting said first and second images onto the write side of said liquid crystal light valve;

a Ronchi grating positioned adjacent said write side of said liquid crystal light valve in the optical path of said input images and spaced apart from said liquid crystal light valve by a distance equal to or less than the Rayleigh length for the average spectral wavelength produced by said input images and having a spatial frequency approximately equal to or greater than twice the highest spectral frequency provided by said input images;

readout means for projecting a coherent optical beam on the readout side of said liquid crystal light valve where it is reflected toward an image plane where it is an output beam;

readout imaging means for focusing the reflected readout beam onto an output image plane;

optical filter means positioned in the optical path of said readout beam between said readout imaging means and said image plane for filtering all but one of the odd spectral orders for said output beam.

4,707,078

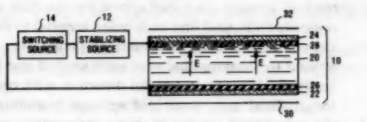
FERROELECTRIC LIQUID CRYSTAL DEVICES USING FIELD-STABILIZED STATES

John M. Geary, Scotch Plains, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 26, 1985, Ser. No. 727,690

Int. Cl.[4] G02F *1/133, 1/18*

U.S. Cl. 350—332 **18 Claims**



1. A liquid crystal device comprising:

a liquid crystal cell containing a ferroelectric liquid crystal material having a characteristic switching time, and means for applying an electric field to said material,

CHARACTERIZED IN THAT said applying means includes, in combination,

means for applying a stabilizing electric field which has a half-cycle time shorter than the switching time of said material, and

means for applying a switching electric field which has a duration longer than or equal to the switching time of said material.

4,707,079

LIQUID CRYSTAL PANEL HAVING UNIAXIALLY-STRETCHED SUBSTRATES

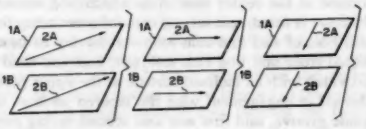
Hiroshi Inoue, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 698,828, Feb. 6, 1985, Pat. No. 4,643,531. This application Oct. 31, 1986, Ser. No. 925,786

Claims priority, application Japan, Feb. 15, 1984, 59-26683; Feb. 15, 1984, 59-26684; Feb. 15, 1984, 59-26685

Int. Cl.⁴ G02F *1/13*

U.S. Cl. 350—334 **7 Claims**



1. A liquid crystal panel comprising plastic films as substrates, which comprises as the plastic films at least two monoaxially stretched films disposed to have their stretched directions substantially in parallel or in counter-directionally parallel with each other and a liquid crystal filling the gap between the monoaxially stretched films.

4,707,080

ENCAPSULATED LIQUID CRYSTAL MATERIAL, APPARATUS AND METHOD

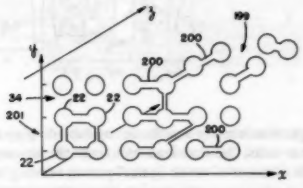
James L. Fergason, Atherton, Calif., assignor to Manchester R & D Partnership, Pepper Pike, Ohio

Continuation-in-part of Ser. No. 302.780, Sep. 16, 1981, Pat. No. 4,435,047, and a continuation-in-part of Ser. No. 477,138, Mar. 21, 1983, Pat. No. 4,606,611, and a continuation-in-part of Ser. No. 477,242, Mar. 21, 1983, Pat. No. 4,616,903. This application Mar. 2, 1984, Ser. No. 585,883

The portion of the term of this patent subsequent to Mar. 6, 2001, has been disclaimed.

Int. Cl.⁴ G02F *1/13*; C09K *19/00, 19/52*

U.S. Cl. 350—334 **52 Claims**



1. A liquid crystal apparatus, comprising liquid crystal material contained in volumes formed in a containment medium, a pair of electrodes respectively on opposite sides of said liquid crystal material and containment medium, said liquid crystal material having positive dielectric anisotropy and an extraordinary dielectric coefficient in the presence of an electric field that is at least substantially equal to the dielectric constant of said medium, whereby in the presence of an electric field applied by said electrodes across said liquid crystal material and containment medium the field lines therein will be substantially flat.

3. A liquid crystal apparatus comprising operationally nematic liquid crystal material having positive dielectric anisotropy, and a containment medium for containing a plurality of interconnected volumes of said liquid crystal material in said containment medium, said containment medium including surface means for inducing a generally non-parallel alignment of said liquid crystal material which in response to such alignment at least one of scatters and absorbs and which in response to a prescribed input reduces the amount of such scattering or absorption.

4,707,081

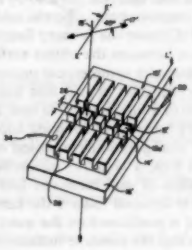
LINEAR LIGHT VALVE ARRAYS HAVING TRANSVERSELY DRIVEN ELECTRO-OPTIC GATES AND METHOD OF MAKING SUCH ARRAYS

Jose M. Mir, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 27, 1985, Ser. No. 780,873

Int. Cl.⁴ G02F *1/03*; H05K *3/04*

U.S. Cl. 350—388 **5 Claims**



1. A light valve array member having discretely addressable electro-optic gates for selectively changing the polarization of light passing therethrough, said member comprising:

(a) a wafer of electro-optic material having opposing major surfaces which are substantially flat and parallel at a modulation zone, said wafer having a pair of spaced parallel grooves of uniform depth and width which extend into said wafer's thickness from portions of one major surface of wafer so as to form therebetween, at said modulation zone, a light modulation portion having opposing, parallel side walls respectively within the depths of said grooves;

(b) a plurality of discrete addressing electrode strips on said wafer, said addressing electrode strips extending in spaced relation over the walls and bottom surface of a first of said grooves and across a major surface portion of said wafer that is separated from said modulation portion by said first groove, to electrical address connection locations on said wafer;

(c) reference electrode means deposited on said wafer and extending over the walls and bottom surface of the second of said grooves and across a major surface portion of said wafer that is separated from said modulation portion by said second groove, to an electrical reference connection location(s) on said wafer; and

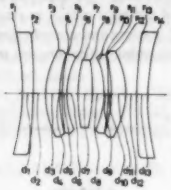
(d) a plurality of uniformly spaced, parallel modulator grooves extending, perpendicular to said first and second grooves, through said modulator portion of said wafer and across said first groove and its adjacent major wafer surface portion to define said addressing electrode strips.

4,707,082

VARIABLE MAGNIFICATION COPYING LENS SYSTEM

Takayuki Itoh, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 5, 1985, Ser. No. 804,970
Claims priority, application Japan, Dec. 13, 1984, 59-264109
Int. Cl.[4] G02B *15/14, 9/64*
U.S. Cl. 350—425 9 Claims



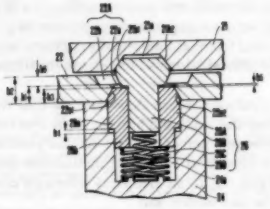
1. In a variable magnification copying lens system with the arrangement, in order from the object side, of a first lens unit (A) having a negative focal length, a lens group (B) having a positive focal length, and a second lens unit (C) having a negative focal length, said system being capable of maintaining a constant distance between the object surface and the image surface not only by changing the distance between the first lens unit (A) and the lens group (B) and that between the lens group (B) and the second lens unit (C), but also by moving the overall lens system, the improvement wherein said first and second lens units (A) and (C) have the primary function of maintaining a constant distance between the object surface and the image surface by a substantially symmetrical movement with respect to the lens group (B), each of said first and second lens units being simply made of a single negative lens, said lens group (B) having the primary function of zooming and having a five-unit and five-element configuration composed of a center, single-element biconvex lens, a negative meniscus lens that is positioned on both sides of said biconvex lens and the concave surface of which is directed toward the center, and a positive meniscus lens that is positioned on the outer side of said negative meniscus lens and the concave surface of which is directed toward the center, said lens elements of said lens group (B) having fixed positions relative to one another.

4,707,083

LENS MOVING DEVICE

Toshimi Iizuka, Kanagawa, and Shigeru Kamata, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha

Filed Sep. 20, 1985, Ser. No. 778,381
Claims priority, application Japan, Sep. 29, 1984, 59-146577[U]; Oct. 24, 1984, 59-159783[U]; Aug. 28, 1985, 60-130941[U]
Int. Cl.[4] G02B *7/04*
U.S. Cl. 350—429 9 Claims



8. A lens moving device comprising:

(a) a lens for performing zooming function, and a member for holding said lens;

(b) a body tube having a groove for guiding said lens holding member, the side edges of said guide groove being made tapered in a direction to go wider toward the optical axis of the lens moving device;

(c) an axially movable sleeve fitted in said body tube and arranged to move axially along an optical axis by an external force, said axially movable sleeve having a camming slot to cross said guide groove, the side edges of a radial lower half of said camming slot being made tapered so as to go wider toward the optical axis of the lens moving device, and the radial upper half being made a groove portion of a wider width than that of a lower tapered groove; and

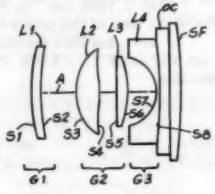
(d) cam follower means including as first cam follower fitted in said lens holding member, a second cam follower fitted in said first cam follower, and first and second spring members urging said first and second cam followers to be pressed against said tapered surfaces, said first cam follower being provided with an inclined surface at the upper periphery thereof in engagement with said lower tapered groove of said axially movable sleeve and with a hole formed at the center thereof in which said second cam follower is fitted, said second cam follower being fitted in said hole of said first cam follower, having its head projected from said first cam follower, and said head being provided with an inclined surface at the upper periphery thereof in engagement with the tapered surfaces of said guide groove, said first and said second spring members being helical springs of large and small diameters respectively, said small diameter spring being put into the inside of said large diameter spring, said large diameter spring urging said first cam follower, and said small diameter spring urging said second cam follower.

4,707,084

PROJECTION LENS

Ellis I. Betensky, Redding, Conn., assignor to U.S. Precision Lens, Inc., Cincinnati, Ohio

Continuation-in-part of Ser. No. 642,825, Aug. 21, 1984, Pat. No. 4,697,892, which is a continuation-in-part of Ser. No. 543,017, Oct. 18, 1983, abandoned. This application Sep. 19, 1984, Ser. No. 652,062
Int. Cl.[4] G02B *13/18, 9/34*
U.S. Cl. 350—432 43 Claims



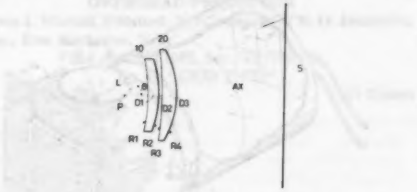
1. A projection lens for a cathode ray tube display consisting of three lens units, the first lens unit from the image end consisting of an element of weak optical power serving to provide correction for aperture dependent aberrations; a second lens unit providing essentially all of the positive power of the overall lens; the third lens unit consisting of a negative element having a concave image side surface and providing correction for field curvature; said second lens unit comprising of two airspaced elements and being overall biconvex, at least one of the surfaces of the elements of said second lens unit having an aspheric surface, and said facing surfaces of said elements of said second lens unit being defined on radii at the optical axis of said lens elements, which are at least twice as great as the equivalent focal length of said lens.

4,707,085

Fθ LENS FOR USE IN LIGHT BEAM SCANNER

Kenichi Takanashi, Kanagawa, and Nobuo Sakuma, Tokyo, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Jan. 24, 1986, Ser. No. 822,106
Claims priority, application Japan, Jan. 25, 1985, 60-012211
Int. Cl.[4] G02B *26/10, 9/06*
U.S. Cl. 350—480 6 Claims



1. An *fθ* lens for use in a light beam scanner for deflecting a light beam, said *fθ* lens comprising:

two positive-meniscus lenses having concave surfaces directed to a deflection point about which the light beam is deflected, said lenses having lens surfaces having radii of curvature R1, R2, R3, R4 in order from said deflection point, said lenses having a focal length f of the entire lens system as a whole, said *fθ* lens meeting the following conditions:

$$0.8 \leqq \frac{R2}{R4} \leqq 1.2 \quad \text{(i)}$$

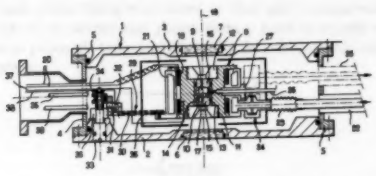
$$0.76 \leqq -\frac{R2}{f} \leqq 0.96. \quad \text{(ii)}$$

4,707,086

STAGE ASSEMBLY FOR THERMODYNAMIC STUDY UNDER A MICROSCOPE

Noël Dahan, Aulnay Sous Bois; Nicole Guilhaumou, Paris, and René W. Couty, Le Perreux, all of France, assignors to Centre National de la Recherche Scientifique, France

Filed Feb. 13, 1986, Ser. No. 829,438
Claims priority, application France, Feb. 21, 1985, 85 02512
Int. Cl.[4] G01N *21/01;* G02N *21/34*
U.S. Cl. 350—536 17 Claims



15. A stage assembly for thermodynamic study under a microscope, the assembly being intended for use in experiments in which the parameters of temperature and pressure are physical parameters capable of varying over very wide ranges, said assembly compising:

a sealed outer envelope having a bottom face and a top face, each of which is provided with an optical window;

an inner enclosure lodged inside said outer envelope, and having a central hollow which is closed at its top and bottom by respective optical windows suitable for defining an experimental volume, said windows of said inner enclosure and of said outer envelope being parallel and aligned along an optical observation axis;

means for sealing the walls of said experimental volume so that it will retin a range of pressure values extending from a value below atmospheric pressure to a value higher than atmospheric pressure; and

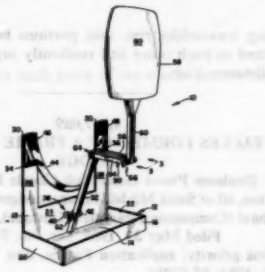
means for fixing and/or monitoring the values of the parmeters of pressure and temperature extending inside said expeimental volume, said means being accesible from the outside by means of a sealed passage through the side wall of said outer envelope.

4,707,087

PORTABLE ADJUSTABLE MIRROR ASSEMBLY

Willie L. Van Zandt, 1620 Ridgecrest, Odessa, Tex. 79763

Filed May 7, 1986, Ser. No. 860,438
Int. Cl.[4] G02B *7/18, 5/08*
U.S. Cl. 350—638 16 Claims



1. A portable adjustable mirror assembly comprising:

A. a box comprising a base and an upright rear wall, said rear wall being provided with two neck strap supports, said neck strap supports comprising two upstanding leg portions of said rear wall, each of said upstanding leg portions having an upper end distal from the base and having first fastening means provided on a surface adjacent said upper end;

B. a neck strap having two ends, each of said ends of the neck strap having second fastening means provided on a surface thereof, said second fastening means being adapted to removably engage the first fastening means of the neck strap supports;

C. a mirror support having a first end and a second end, a portion of said mirror support adjacent the first end being movably secured to the box; and

D. a mirror movably secured to the second end of the mirror support;

said mirror support comprising a first a first arm having first and second ends, the first end of the first arm being the first end of the mirror support, the second end of the first arm being movably secured to the first end of the second arm, and the second end of the second arm being the second end of the mirror support.

4,707,088

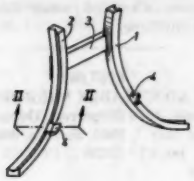
LORGNETTE EYEGLASS FRAME

Vittorio Tabacchi, Z.I. - VII Strada, n. 20, 35129 Padova, Italy

Filed Jan. 13, 1986, Ser. No. 818,131
Int. Cl.[4] G02C *3/04;* A45C *11/04*
U.S. Cl. 351—56 3 Claims

1. A lorgnette eyeglass frame comprising a lens-holder frame to which there is attached a rigid, bar-shaped handle, characterized by the fact that said handle is of box shape and that said frame is slideably guided within it between a first position in which it extends from it and a second position in which it is completely contained within it, said handle constituting a case for said frame when it is in said second position, and having within it a pair of facing projections extending longitudinally parallel to and close to one of its walls and capable of forming

a guide channel for a crossbar of said lens, said crossbar in its turn being formed of two portions, each provided with a corresponding lens-holder rim, said portions being telescopically connected to each other and resiliently urged into the maximum distance apart.



4,707,089

SPECTACLES FORMED OF A FRAME AND A SADDLE BRIDGE

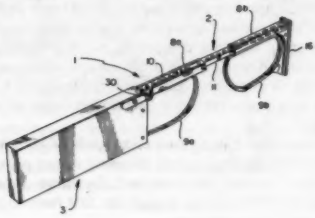
André Danloup; Pierre Galzandat; Claude Hubin, and Charles Storino, all of Saint Mihiel, France, assignors to Essilor International (Compagnie Generale d'Optique), Creteil, France

Filed May 31, 1985, Ser. No. 740,007

Claims priority, application France, Jun. 4, 1984, 84 08720; Jul. 30, 1984, 84 12056

Int. Cl.[4] G02C *5/12, 1/00*

U.S. Cl. 351—138 **6 Claims**



1. A spectacle frame comprising:

two eyewires substantially located in a plane;

at least one assembly bar connected with the two eyewires;

each eyewire including at least one projecting element, each projecting element being oriented in a direction substantially perpendicular to said plane;

a saddle bridge including two alae;

each alae including a channel intended to be inserted in a nasal rest zone of a corresponding eyewire, each channel having a widthwise dimension slightly smaller than the widthwise dimensions of said projecting elements; and

each projecting element being secured in a lateral wall of a corresponding channel of the saddle bridge so as to secure the saddle bridge with the two eyewires.

4,707,090

OBJECTIVE REFRACTOR FOR THE EYE

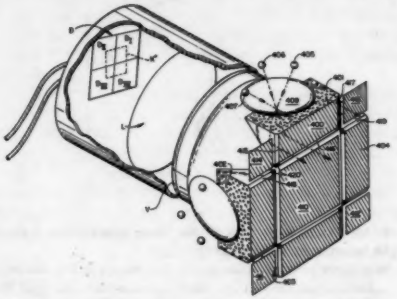
William E. Humphrey, San Leandro, Calif., assignor to Humphrey Instruments, Inc., San Leandro, Calif.

Division of Ser. No. 202,536, Oct. 31, 1980, abandoned. This application Jun. 22, 1984, Ser. No. 623,732

Int. Cl.[4] A61B *3/10*

U.S. Cl. 351—211 **3 Claims**

1. A detector for detecting an image on the retina of the eye having a low level of light, said detector comprising in combination: means for projecting an illuminated target having a knife edge boundary to the eye to form an image on the eye; a photosensitive surface having in side-by-side combination two photoelectrically discrete surface, each said photoelectrically discrete surface for detecting light without electrical communication to the other photoelectrically discrete said surface; means for relaying light from said image on the retina of the eye to said photosensitive surface and forming an image therebetween; and an optic adjacent said image between said light source and said photosensitive surface, said optic including side-by-side discontinuous, spherical optical elements having a variation in optical effect across said optic for distributing the light from said image on said retina of said eye at discrete areas on said optic in a weighted manner across said photoelectrically discrete surface to emit from an image at or near said optic of said low light level image, signals proportional to the distribution of light at said image on said retina of said eye.



4,707,091

ULTRAVIOLET METHOD FOR MAKING OPTICAL COMPOSITES

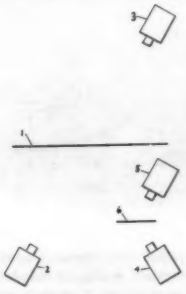
Dennis R. Anthony, 3119 Kelton Ave., Los Angeles, Calif. 90034

Filed Sep. 6, 1984, Ser. No. 647,681

The portion of the term of this patent subsequent to Jan. 17, 2004, has been disclaimed.

Int. Cl.[4] G03B *19/18;* **A63J** *5/00*

U.S. Cl. 352—47 **2 Claims**



1. A method of combining two or more separate images into an optical composite, which method comprises projecting onto a screen that contains transparent or translucent semiconductor material, with ultraviolet light whose photon energy exceeds the band-gap energy of the semiconductor material, a silhouette of each of the foreground images to be inserted into a background image; projecting onto the said screen from the front each of the appropriate foreground images such that each image appears on the screen congruent with its ultraviolet silhouette; projecting onto the screen from the rear the appro-

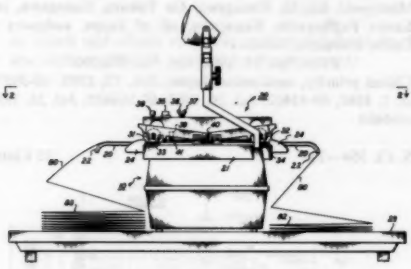
priate background image; and photographing the result from the front of the screen.

4,707,092

TRANSPARENCY TRANSPORT SYSTEM FOR OVERHEAD PROJECTOR

Marvin I. Mindell, Pittsford, N.Y., assignor to D. O. Industries, Inc., East Rochester, N.Y.

Filed Apr. 24, 1985, Ser. No. 726,782
Int. Cl.[4] G03B *21/12*
U.S. Cl. 353—109 **27 Claims**



1. An overhead projector transparency transport system comprising:

a. a transparent platen extending across a projection window of said overhead projector and beyond both sides of said projector;

b. a transparent belt formed of a transparent base web and a transparent pocket web fused together to form a series of pockets sized to receive a sequence of transparencies;

c. said pocket web being fused to said base web along transverse fold lines between said transparency pockets so that said belt can fan fold;

d. said pocket web being fused to said base web at inturned edges of an open side of each pocket so that the distance between said inturned edges is smaller than the dimension of a transparency inserted through said open side into said pocket; and

e. said platen being positioned so that said transparent belt advances across said platen from a fan-fold supply stack and proceeds to an automatically formed fan-fold take-up stack.

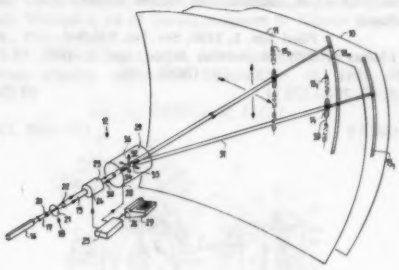
4,707,093

METHOD AND DEVICE FOR ILLUMINATING THE FACE PLATE OF A COLOR TELEVISION TUBE FOR FORMATION OF THE SCREEN

Pierluigi Testa, Rome, Italy, assignor to Videocolor, Montrouge, France

Filed May 29, 1986, Ser. No. 867,990
Claims priority, application France, Jun. 4, 1985, 85 08396
Int. Cl.[4] G03B *41/00*
U.S. Cl. 354—1 **13 Claims**

1. A device for illuminating photosensitive light hardenable material for manufacturing the screen of a perforated mask type color cathode ray tube comprising; a luminous source emitting a pencil of light and a deflector for deviating this pencil of light so that it scans the screen in front of which is disposed the perforated mask which further includes a light modulator subjected to a pencil of light from said luminous source and controlled by a computer in order that the luminous



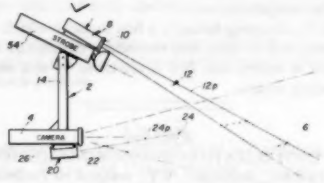
intensity received by each point of the screen be substantially constant.

4,707,094

APPARATUS AND METHOD OF SUBMARINE OPTICAL RECORDING

Robert F. Tusting, Ft. Pierce, Fla., assignor to Harbor Branch Oceanographic Institution Inc., Ft. Pierce, Fla.

Filed Mar. 21, 1986, Ser. No. 842,139
Int. Cl.[4] G03B *17/08*
U.S. Cl. 354—64 **12 Claims**



1. Apparatus for submarine optical recording comprising:

a camera to record scenes in a predetermined sector forward thereof,

a source of light having a wavelength in the range between about 650 and 700 nm. provided with first optical means to project a divergent conical light beam from said source,

means locating said first optical means spaced apart radially from said source to project said light beam so that it intersects said predetermined sector,

receiver means to detect and measure the intensity of light in said wavelength range provided with second optical means to view a conical volume,

means locating said second optical means spaced apart radially from said camera so said conical volume intersects said light beam and the intersecting peripheries of said light beam and said conical volume substantially define said predetermined sector, and

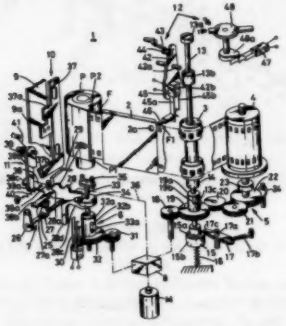
signal means that is activated by said receiver means when it measures an intensity of light in said wavelength range above a predetermined minimum value.

4,707,095

FILM REWINDER

Yoshiyuki Nakano, Tokyo, and Mikio Takemae, Yokohama, both of Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed Apr. 1, 1986, Ser. No. 846,944
Claims priority, application Japan, Apr. 8, 1985, 60-74016
Int. Cl.[4] G03B 1/00
U.S. Cl. 354—173.11 10 Claims



8. A device for rewinding a film drawn out from a film cartridge contained in a camera into said cartridge, said film having a leader portion at an end of the film, said device comprising:

an electric motor;

first rewinding means driven by said motor for transporting said drawn-out film toward said cartridge until said leader portion of said film remains outside of said cartridge by a determined amount;

second rewinding means driven by said motor for transporting said drawn-out film toward said cartridge so that said leader portion of said film is transported into said cartridge completely; and

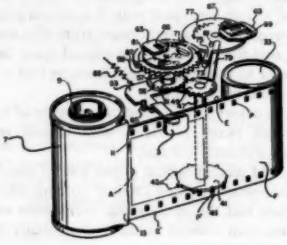
means for changing between a first mode in which said film is rewound by said first rewinding means and a second mode in which said film is rewound by said second rewinding means.

4,707,096

FILM INITIALIZATION REASSURING MECHANISM

Joel S. Lawther, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 12, 1987, Ser. No. 2,530
Int. Cl.[4] G03B 1/66
U.S. Cl. 354—215 8 Claims



1. An improved photographic camera of the type wherein a frame counter is adapted to provide respective visible indications corresponding to successive frames on an unexposed filmstrip as each one of the frames is positioned for exposure, and wherein the improvement comprises:

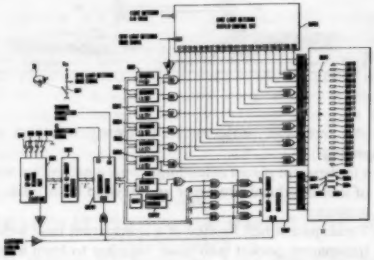
means, responsive to said frame counter providing a visible indication corresponding to the first frame to be positioned for exposure, for providing a reassuring indication that the first frame is positioned for exposure.

4,707,097

FILM FRAME NUMBER DISPLAY DEVICE FOR CAMERA

Kazuhiko Arakawa, Tokyo; Yoshihito Harada, Kanagawa; Masayoshi Kiuchi, Kanagawa; Go Tokura, Kanagawa, and Kazuo Fujibayashi, Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha

Filed Feb. 21, 1986, Ser. No. 831,600
Claims priority, application Japan, Feb. 27, 1985, 60-38576; Mar. 1, 1985, 60-41402; Jul. 26, 1985, 60-166403; Jul. 26, 1985, 60-166404
Int. Cl.[4] G03B 1/66
U.S. Cl. 354—217 15 Claims



1. A film frame number display device for a still camera comprising:

(a) a first display circuit for displaying film frame number information in numeral form;

(b) a second display circuit having a plurality of pattern portions to display the film frame number information in a different form from said numeral form; and

(c) a prohibiting circuit for prohibiting display of film frame number information by said first display circuit when the film frame number information does not satisfy the condition that the frame number information $\leqq 9$ frames, whereby said first display circuit is a one-digit display circuit.

4,707,098

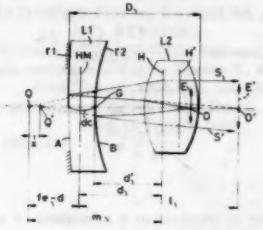
ALBADA FINDER

Koichi Wakamiya, Tokyo, Japan, assignor to Nippon Kogaku K. K., Tokyo, Japan

Filed Mar. 11, 1986, Ser. No. 838,572
Claims priority, application Japan, Mar. 14, 1985, 60-51297
Int. Cl.[4] G03B 13/02
U.S. Cl. 354—219 18 Claims

1. In an albada finder having index means for indicating the photographable area of an object to be photographed and an albada reflecting surface positioned more adjacent to the object side than said index means and reflecting a light beam from said index means toward the observer side, the improvement comprising:

a lens having two surfaces adjacent to the object side and the observer side, respectively, that are in contact with air and



in which said albada reflecting surface is formed on the lens surface which is adjacent to the object side.

4,707,099

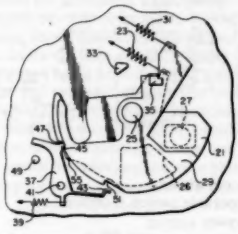
LATCH MECHANISM FOR CAMERA SHUTTER

Giang T. Ngo, Hilton, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 19, 1986, Ser. No. 932,424

Int. Cl.[4] G03B 9/10

U.S. Cl. 354—251 **2 Claims**



1. An improved camera shutter of the type wherein (a) a shutter opening blade is urged to move from a cocked position to open said camera shutter, (b) a shutter closing blade is urged to move from a cocked position to close said camera shutter, and (c) a latch for retaining said shutter opening and closing blades in their cocked positions releases the blades in succession to open and close said camera shutter, and wherein the improvement comprises:

said latch includes initial latching means for releasably retaining said shutter opening and closing blades in a locked together condition in their cocked positions, prior to release of the opening blade to open said camera shutter, and flexible latching means for releasably retaining the closing blade in its cocked position to prevent closing of the camera shutter, after the opening blade is released; and

said shutter opening blade includes camming means for flexing said flexible latching means to release said shutter closing blade to close said camera shutter.

4,707,100

DEVICE FOR LOCKING THE OPERATION RING OF PHOTOGRAPHING LENS

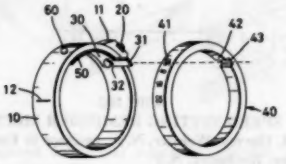
Hiroshi Okano, Tokyo; Hideo Kanno, Chiba, and Sachio Ohmori, Yokosuka, all of Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed Dec. 1, 1986, Ser. No. 936,628

Claims priority, application Japan, Dec. 10, 1985, 60-190000[U]

Int. Cl.[4] G03B 9/02, 17/00

U.S. Cl. 354—273 **5 Claims**



1. In a photographing lens tube having a manual operation ring mounted for rotation about the optical axis of the lens and a stationary ring disposed adjacent to the manual operation ring and fixed with its center on the optical axis, a locking device for locking said manual operation ring in a predetermined position comprising:

a lock member projecting from one of said two rings to the other ring and movable in radial direction;

a lock part formed on the other ring for engagement with said lock member;

a lock-operating member movable between two positions, that is, a lock position in which it can be rotatably connected with said lock member passing through said one ring and can move radially to bring said lock member and lock part into engagement, and an unlock position in which it can disengage said lock member from said lock part;

spring means for biasing said lock-operating member together with said lock member toward said lock position; and

limiting means for holding said lock-operating member in said unlock position and limiting the return motion toward said lock position.

4,707,101

OPERATING MEMBERS FOR A CAMERA

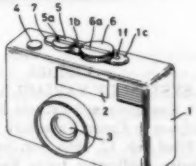
Jun Akabane, Tokyo, and Hitoshi Suyama, Kawasaki, both of Japan, assignors to Nippon Kogaku K. K., Tokyo, Japan

Filed Dec. 5, 1986, Ser. No. 938,609

Claims priority, application Japan, Dec. 16, 1985, 60-193325[U]

Int. Cl.[4] G03B 17/00

U.S. Cl. 354—289.1 **5 Claims**



1. A camera comprising:

a camera housing;

a plurality of operating members turnably disposed on said camera housing;

a band-shaped turning movement indication pattern formed

on each of said operating members to indicate turning movement of the latter;

stationary indication patterns disposed between the adjacent operating members on the camera housing and having the substantially same width as that of said turning movement indication patterns; and

the turning movement indication patterns on the operating members being aligned with said stationary indication patterns on a common band-shaped area on the camera housing when each of the operating members is set to a predetermined position.

4,707,102

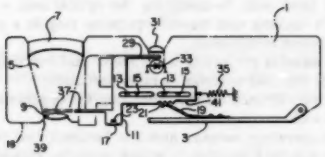
FILM SPEED SETTING REMINDER MECHANISM

Donald M. Harvey, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 12, 1987, Ser. No. 2,469

Int. Cl.[4] G03B *17/20*

U.S. Cl. 354—289.1 **4 Claims**



1. An improved photographic camera of the type wherein (a) a door is opened to load various speed films into said camera, (b) a manually operated film speed setting member has a plurality of film speed related positions, and (c) a viewfinder window is provided for viewing a subject to be photographed, and wherein the improvement comprises:

means supporting said setting member for movement to a non-film speed related position in which the setting member at least partially blocks said viewfinder window and for movement away from the window to the respective film speed related positions; and

means for moving said setting member to the non-film speed related position in response to the opening of said door, whereby when a particular speed film is loaded in said camera a reminder will be provided in said viewfinder window to manually move the setting member to a film speed related position corresponding to the speed of the loaded film.

4,707,103

OPTICAL SYSTEM OF VARIABLE MAGNIFICATION

Keiji Ikemori, Kanagawa, and Takeshi Koyama, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Japan

Filed Feb. 12, 1986, Ser. No. 828,959

Claims priority, application Japan, Feb. 12, 1985, 60-024911; Apr. 9, 1985, 60-075110

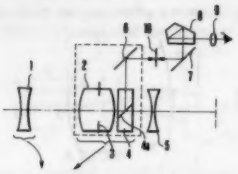
Int. Cl.[4] G03B *3/00, 13/08*

U.S. Cl. 354—403 **23 Claims**

1. An optical system comprising:

an image forming zoom optical system having first optical means axially movable when zooming; and

light beam splitting means for splitting an optical path of said image forming optical system, said light beam splitting



means moving in response to a movement of said first optical means.

4,707,104

CAMERA HAVING MOTOR-DRIVEN FILM WIND AND REWIND SYSTEM

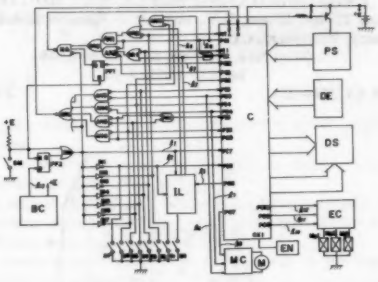
Manabu Inoue, Kobe; Akihiko Fujino, Sakai; Masayasu Hirano, Nishinomiya; Masaaki Nakai, and Fumio Yoshida, both of Kawachinagano, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Nov. 29, 1985, Ser. No. 802,746

Claims priority, application Japan, Nov. 30, 1984, 59-182704[U]; Dec. 12, 1984, 59-188613[U]; Dec. 12, 1984, 59-188614[U]; Dec. 13, 1984, 59-189024[U]

Int. Cl.[4] G03B *1/18, 7/26*

U.S. Cl. 354—412 **6 Claims**



1. A camera, comprising:

a manually operable switch member;

an electric power source;

brightness measuring means for measuring brightness of an object to be photographed, wherein the brightness measuring means is responsive to the electric power source and generates an output signal;

power supply control means for controlling electric power supplied by the electric power source, wherein the control means is responsive to operation of the switch member;

exposure control means for controlling exposure of the camera in response to the output signal generated by the brightness measuring means;

film winding means for winding a film upon termination of an operation of the exposure control means;

film end detector means for detecting an end of the film;

film winding interrupting means for interrupting an operation of the film winding means upon detection of the end of the film by the film end detector means; and

power supply interrupting means for interrupting electric power supplied to the brightness detecting means, wherein the power supply interrupting means interrupts the power supplied to the brightness detecting means

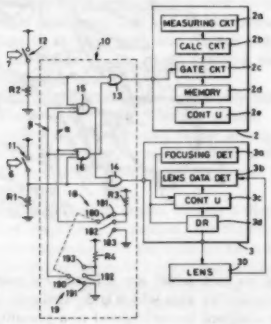
when the end of the film is detected by the film end detector means even if the switch member is operated.

4,707,105

APPARATUS FOR FIXING EXPOSURE AND FOCUS IN CAMERA

Sunao Nishioka, Tokyo, and Mikio Takemae, Yokohama, both of Japan, assignors to Nippon Kagaku K. K., Tokyo, Japan

Filed Nov. 20, 1986, Ser. No. 932,800
Claims priority, application Japan, Dec. 2, 1985, 60-271269
Int. Cl.[4] G03B *7/00*
U.S. Cl. 354—412 **5 Claims**



5. A camera comprising:

(a) exposure control means for controlling an exposure according to exposure data changing in response to an illuminance of an object to be photographed;

(b) focusing control means for controlling shifting of a focusing optical system to a just-in-focus state according to data changing in response to a distance to an object to be photographed;

(c) operating means adapted to be operated;

(d) fixing means for generating a first fixing signal for causing said exposure control means to fix the exposure data and a second fixing signal for causing said focusing control means to fix the state of said focusing optical system, said fixing means being provided with a mode for generating the first and second fixing signals in response to the operation of said operating means and a mode for generating one of the first and second fixing signals in response to the operation of said operating means; and

(e) selecting means for selecting one of a plurality of modes of said fixing means in response to the operation.

4,707,106

MULTIPLE FORMAT CAMERA AND ACCESSORY

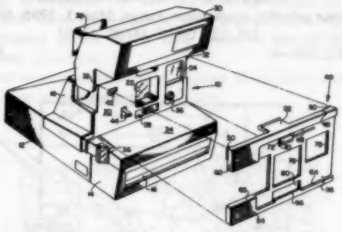
Bruce K. Johnson, Andover, Mass.; Juan Estévez, Enschede, Netherlands; Robert M. Goward, Bow, N.H., and George D. Whiteside, Lexington, Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Mar. 3, 1986, Ser. No. 835,299
Int. Cl.[4] G03R *7/099*; G03B *11/00, 17/12*
U.S. Cl. 354—481 **8 Claims**

1. In photographic apparatus including a camera having an objective aperture and an automated exposure and film transport system operable normally to expose the image frame of a single film unit to a single light image, the improvement comprising in combination:

manually operated override means accessible on the camera exterior for altering camera operation between a normal automated single-image format mode and a multiple-image format mode; and

a masking accessory kit including an adapter mountable on the camera in fixed relation to the objective aperture, at least one mask adapted for multipositional support by said adapter, and means for establishing at least two positions of said mask in said adapter and relative to the camera objective aperture, said automated exposure and film transport system including directional photosensitive



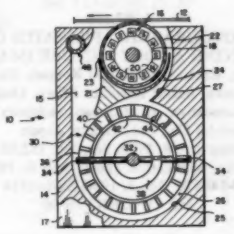
means spaced from said exposure aperture, and said adapter comprises at least a transparent portion to lie in the path of said photosensitive means and diffuse light passing thereto as so to diminish the directional response of said photosensitive means.

4,707,107

ELECTROPHOTOGRAPHIC DEVELOPMENT APPARATUS WITH AN IMPROVED RIBBON BLENDER

Brian J. Joseph, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 28, 1986, Ser. No. 935,877
Int. Cl.[4] G03G *15/00*
U.S. Cl. 355—3 DD **4 Claims**



1. In a development station of an electrographic apparatus having a sump for receiving a supply of developer material and a ribbon blender for mixing the material in the sump, the ribbon blender being rotatable about an axis and having an elongate helical ribbon positioned within the sump and having a plurality of convolutions axially spaced along the sump, the improvement comprising:

a plurality of feed members adjacent the ribbon and extending generally axially relative to the ribbon, the feed members being spaced from each other along the ribbon and being spaced from feed members on adjacent convolutions of the ribbon.

4,707,108

IMAGE FORMING APPARATUS HAVING MOVABLE DEVELOPING MEANS AND MEANS FOR REMOVING DEVELOPER THEREFROM

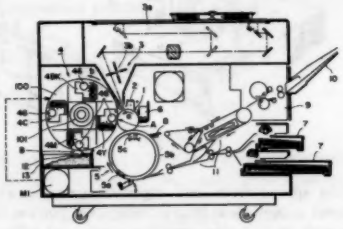
Akio Ohno, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 27, 1986, Ser. No. 833,617

Claims priority, application Japan, Mar. 1, 1985, 60-38695

Int. Cl.[4] G03G *15/09, 15/01*

U.S. Cl. 355—4 **35 Claims**



1. An image forming apparatus comprising:

an image bearing member;

means for forming on said image bearing member a latent image in accordance with image information;

movable developing means for developing the latent image formed on said image bearing member by said latent image forming means, said developing means being movable between a developing position where said developing means develops the latent image on said latent image bearing member and a developer collecting position wherein the developer in said developing means is removed and collected therefrom; and

removing means, cooperating with said developing means when it is located at said developer collecting position, for removing the developer from said developing means, wherein when the developer in said developing means is to be removed and collected, said developing means is moved to said developer collecting poisition to allow the developer to be removed therefrom by said removing means.

4,707,109

ELECTROPHOTOGRAPHIC APPARATUS CAPABLE OF EDITING A COPY PICTURE IMAGE

Masashi Kanno, Katano; Katsufumi Komori, Hirakata; Masaichirou Tatekawa, Sakai; Kiyohito Miwa, Osaka, and Iwane Takaoka, Utsunomiya, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jul. 8, 1985, Ser. No. 752,951

Claims priority, application Japan, Jul. 6, 1984, 59-140862; Jul. 6, 1984, 59-140870; Jul. 9, 1984, 59-141914

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—7 **11 Claims**

1. An electrophotographic apparatus capable of editing a copy picture image comprising:

a document table for mounting a document thereon;

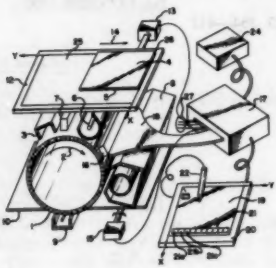
a document irradiation means for irradiating a surface of said document mounted on said document table to obtain a reflection image on the surface of said document;

an optical system for focusing said reflection image onto a photosensitive body to produce a latent image on said photosensitive body;

a photosensitive body irradiation means for directly and selectively irradiating at least a part of said photosensitive body to erase a part of said latent image on said irradiated part of said photosensitive body;

a development means for developing said latent image on said photosensitive body to form a visible image on a plain sheet;

a position and function selecting means provided separately from said document table and comprising a tablet for first mounting said document thereon prior to said document being mounted on said document table and a pen which is coupled to said tablet so that a position on said tablet is detected by an access of said pen, said tablet being divided into a position selecting area in which positions for defining a desired area ons aid surface of said document



mounted on said tablet are selected by said pen and a function selecting area which is divided into a plurality of portions assigned to correspond to a plurality of control functions of said apparatus so that desired one of said control functions is selected by said pen; and

a control means for controlling at least said document irradiation means and said photosensitive body irradiation means in accordance with signals indicative of the selected positions and function from said position and function selecting means so as to obtain an edited latent image on said photosensitive body.

4,707,110

IMAGE FORMING APPARATUS WITH COLOR CHANGE AREA DISCRIMINATING FUNCTION

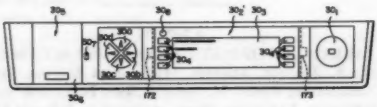
Kentaro Harada, Tokyo, and Junji Watanabe, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 22, 1986, Ser. No. 944,844

Claims priority, application Japan, Dec. 27, 1985, 60-294035; Mar. 20, 1986, 61-63239; Mar. 20, 1986, 61-63240

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—7 **7 Claims**



1. An image forming apparatus with a color change area discriminating function, said apparatus comprising:

an original table on which a light-transmitting original is placed;

transmission light emitting means, provided movable along said original table, for emitting transmission light through the original placed on said original table;

color change area designating means for shifting the light emitted from said transmission light emitting means to an arbitrary area of an original image which is to be subjected to a change in color of image formation to designate the arbitrary area as a portion to be subjected to a change in color of image formation prior to an image formation operation;

color change area storage means for storing first position data representing the area to be subjected to a change in color of image formation and second position data representing a remaining area excluding the area to be subjected to a change in color of image formation, in response to designation by said color change area designating means;

original scanning means, arranged to optically scan the original placed on said original table, for producing an optical image of the original upon completion of scanning of the original;

image forming means for focusing the optical image of the original which is scanned by said original scanning means and selectively driving first and second developing units respectively containing first and second color agents corresponding to at least basic and change colors, thereby forming an image on an image forming medium with predetermined colors;

image erasing means arranged to selectively erase an image to be formed by said image forming means;

image forming medium returning means arranged to selectively return the image forming medium with the image formed by said image forming means to said image forming means;

color change area display means, having a display element capable of displaying a pattern, for flashing a display pattern corresponding to the area to be subjected to a change in color of image formation and designated by said change color area designating means, the display pattern being included in a display pattern corresponding to the original;

first control means for supplying a drive signal to said first developing unit in said image forming means during first image formation operation, reading out from said color change area storage means the first position data representing the area to be subjected to a change in color of image formation and supplying the readout data as an erasure signal to said image erasing means, and supplying a return instruction signal to said image forming medium returning means; and

second control means for supplying a drive signal to said second developing unit in said image forming means during second image formation operation, reading out from said color change area storage means the second position data representing the area excluding the area to be subjected to a change in color of image formation, and supplying the readout data as an erasure signal to said image erasing means.

4,707,111

IMAGE FORMATION APPARATUS INCLUDING MEANS FOR MANUALLY AND AUTOMATICALLY FEEDING COPY THERETHROUGH

Tsuneki Inuzuka, Machida; Yoshihiro Kawatsura, and Masato Ishida, both of Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 428,272, Sep. 29, 1982, abandoned, which is a division of Ser. No. 149,430, May 13, 1980, abandoned. This application Jan. 16, 1987, Ser. No. 5,294

Claims priority, application Japan, May 17, 1979, 54-60786; May 17, 1979, 54-60788; Jul. 16, 1979, 54-98986[U]

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—8 **31 Claims**

1. A copying apparatus comprising:

a platen for supporting thereon an original;

means for illuminating the original on said platen;

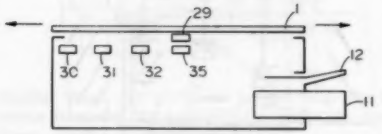
a rotatable member on which an image corresponding to the original image illuminated by said illuminating means is formed;

driving means for moving said platen from a rest position to an exposure start position in one direction, then moving said platen in the opposite direction to scan-illuminate the original and then moving said platen in said one direction toward said rest position after termination of the scan-illumination;

means for prerotating said rotatable member in preparation for a copying operation, while said platen is moved from the rest position to the exposure start position;

means for forming the image corresponding to the original image illuminated by said illuminating means on said rotatable member subjected to the prerotation by said prerotating means, while said platen is moved in said opposite direction;

first feed means for feeding a copying sheet from a supply station to a predetermined position;



second feed means for feeding the copying sheet from said predetermined position to said rotatable member so that the image formed on said rotatable member is recorded on the copying sheet; and

control means for controlling said first and second feed means such that said second feed means is driven to feed the copying sheet from said predetermined position to said rotatable member, while said platen is moved in said opposite direction, and said first feed means is driven to feed the next copying sheet to said predetermined position, while said platen is moved in said one direction after termination of the scan-illumination.

4,707,112

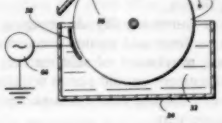
LIQUID DEVELOPMENT SYSTEM

George C. Hartmann, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 16, 1986, Ser. No. 864,044

Int. Cl.[4] G03G *15/10*

U.S. Cl. 355—10 **12 Claims**



1. An apparatus for developing an electrostatic latent image with a liquid developer material comprising at least a liquid carrier having marking particles therein, including:

means for furnishing the liquid developer material to the electrostatic latent image in a development zone to develop the electrostatic latent image; and

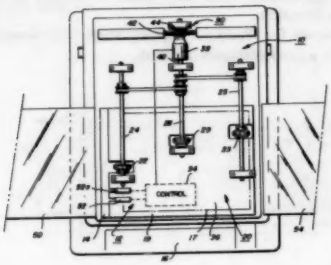
means for dispersing the marking particles substantially uniformly in the liquid carrier of the liquid developer material at the entrance to the development zone so as to deflocculate the marking particles.

4,707,113

DOCUMENT FEEDER FOR MOVING PLATEN COPIERS

Troy Shinbrot, Greenbelt, Md., and Youti Kuo, Penfield, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Aug. 19, 1986, Ser. No. 898,159
Int. Cl.[4] G03G *15/00*; B65H *29/46*
U.S. Cl. 355—14 SH 9 Claims



1. In a copier with a moving platen document imaging system, wherein the platen is a part of a movable platen unit reciprocally driveable relative to the stationary body of the copier for imaging a document in an imaging movement of the moving platen unit while the document is on and moving with the platen unit and with the document being imaged by the copier, the improvement comprising:

an automatic document feeder for automatically feeding documents on to and off of said platen solely utilizing said reciprocal movement of said moving platen unit, said document feeder including:

rotatably driveable document feeding means mounted to said moving platen unit for reciprocal movement therewith but rotatable relative to said platen for movement of documents relative to said platen;

motion converting means for converting said reciprocal motion of said moving platen unit in at least one direction of movement thereof into appropriate intermittent rotation of said document feeding means;

said motion converting means comprising stationary means for generating motion mounted to said stationary body of said copier, and mechanical interconnecting means interconnecting said stationary motion generating means to said document feeding means on said moving platen unit, for intermittently rotatably driving said document feeding means at a document feeding velocity substantially different from the reciprocal movement velocity of said moving platen unit, so as to feed a document on to and over said platen while said platen is reciprocally moving, said document feeding means being driven solely by said motion-converting means;

and means for automatically disengaging said document feeding means from said motion converting means during said imaging movement of said moving platen unit for holding a document on said platen without relative movement between the document and said platen during said imaging movement.

4,707,114

METHOD OF AUTOMATICALLY ADJUSTING IMAGE DENSITY IN IMAGE FORMING DEVICE

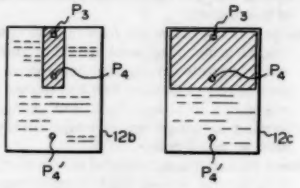
Minoru Aoki, Kawasaki, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Nov. 5, 1986, Ser. No. 927,107
Claims priority, application Japan, Nov. 13, 1985, 60-254220
Int. Cl.[4] G03G *15/00*
U.S. Cl. 355—14 D 6 Claims

1. A method of automatically adjusting image density in an image forming device which controls an imaging condition on the basis of a density of a document, comprising the steps of:

(a) at a start of a copying operation, setting up a first mode in which a first document density is sensed by scanning a first predetermined region of said document and, then, said copying operation is continued while controlling said imaging condition based on said first document density;

(b) if said first document density sensed lies in a predetermined range of density levels, executing said first mode directly; and



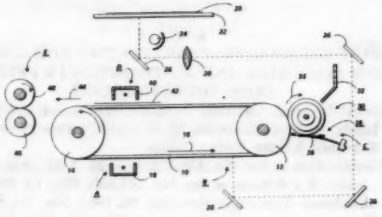
(c) if said first document density does not lie in said predetermined range of density levels, replacing said first mode with a second mode in which a second predetermined region of said document is scanned to produce a second document density and, then, performing a copying operation while controlling said imaging condition based on said second document density.

4,707,115

DEVICE FOR CLEANING A CHARGING MEMBER

Jan Bares, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 28, 1986, Ser. No. 901,493
Int. Cl.[4] G03G *21/00*
U.S. Cl. 355—15 8 Claims



1. An apparatus for developing a latent image with marking particles, including:

a donor roller for transporting the marking particles to the latent image;

a stationary, flexible plate having the free end portion thereof contacting said donor roller to define a nip therebetween for electrically charging and metering the quantity of marking particles being moved to the latent image by said donor roller; and

a flexible cleaning member arranged to move along the free end portion of said plate for periodically cleaning said plate to remove particles adhering thereto.

4,707,116
EXPOSURE DEVICE

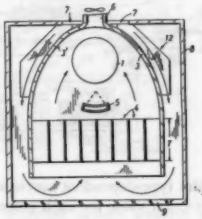
Winfried Newiger, Cleeberg; Wolfgang Walch, Liederbach; Harry Rach, Frankfurt, and Michael Kiessling, Langenselbold, all of Fed. Rep. of Germany, assignors to Klimsch & Co. KG, Frankfurt am Main, Fed. Rep. of Germany

Filed Jul. 11, 1986, Ser. No. 884,430

Claims priority, application Fed. Rep. of Germany, Jul. 17, 1985, 3525482

Int. Cl.[4] G03B *27/52*

U.S. Cl. 355—30 **9 Claims**



1. An exposure device, especially for the contact print of circuit patterns on printed circuit boards, composed of a tubular light source extending with the length thereof throughout the entire exposure field width and disposed in a housing light-permeable over the exposure field, with the light source being disposed within a reflector open toward the exposure field and a light-directing grid covered by the lateral flanks of the reflector being located underneath the light source and a heat insulating plate being provided underneath the light directing grid,

characterized in that an occulting strip (5) is disposed between the light source (1) movable across the exposure field and the light-directing grid, and the reflector (3) is provided with an air exhausting slit (6) extending throughout the entire length thereof, with the housing (8) provided with at least one air inlet port (7) and enclosing the reflector forming the outer part of a ventilation channel guided about reflector (3) and guided through the reflector.

4,707,117
COPYING MACHINE WITH ORIGINAL-POSITION CONFIRMING DEVICE

Kiyoshi Takenaka; Masahiko Ohtsuji, both of Shiga, and Hiroaki Kabuto, Fukui, all of Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan

Filed Oct. 2, 1986, Ser. No. 914,864

Claims priority, application Japan, Oct. 3, 1985, 60-152047[U]

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—3 SH **3 Claims**

1. An apparatus having relatively large size for copying an original comprising:

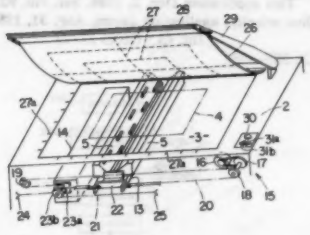
a transparent base plate on which an original bearing a desired original image to be copied is placed, said base plate being supported on a platform which forms an upper surface of said apparatus;

measuring means provided on said platform for measuring the position of the desired original image;

a light source for applying an illumination to said original placed on said base plate, said light source having a first light intensity for illuminating said original for confirming the position of the desired original image and a second light intensity for exposing the desired original image onto a photosensitive material, said light source being movable relative to said original;

driving means for driving said light source relative to said original in different manners according to said modes;

change-over means for changing over between the first mode and the second mode, during the first mode the light source being moved to a desired position where the original is illuminated for confirming the position of the desired



original image, and during the second mode the light source traversing the original for exposing the desired image onto the photosensitive material.

4,707,118
METHOD FOR CONTROLLING EXPOSURE IN COLOR PHOTOGRAPHIC PRINTERS

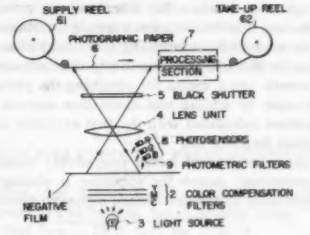
Takaaki Terashita, Ashigara-Kamigun, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Continuation of Ser. No. 709,122, Mar. 6, 1985, abandoned. This application Dec. 2, 1986, Ser. No. 937,470

Claims priority, application Japan, Mar. 13, 1984, 59-48776; Apr. 17, 1984, 59-77304; Dec. 12, 1984, 59-261971

Int. Cl.[4] G03B *27/78*

U.S. Cl. 355—38 **8 Claims**



1. A control method for controlling the printing exposure amount in a color photographic printer which changes and controls the exposure amount in three primary colors from an exposure amount at a reference condition, and which comprises the steps of:

storing characteristics of a photographic paper for printing;

photographically measuring a density of a film to be printed;

obtaining a desired density which is an estimated value corresponding to a printing density at the reference condition before the changing of the exposure amount using a functional formula which includes the measured density and the stored characteristics;

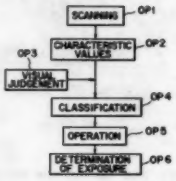
obtaining a correction amount according to the desired density and an estimated density which is an estimated value of a printing density after the changing of the exposure amount; and

controlling an exposure amount by adding or subtracting the correction amount thereto after the changing thereof.

4,707,119
PHOTOGRAPHIC PRINTER

Takaaki Terashita, Kaisei, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Continuation of Ser. No. 768,233, Aug. 22, 1985, abandoned. This application Dec. 2, 1986, Ser. No. 937,471
Claims priority, application Japan, Aug. 31, 1984, 59-182207
Int. Cl.[4] G03B *27/73*
U.S. Cl. 355—38 **10 Claims**



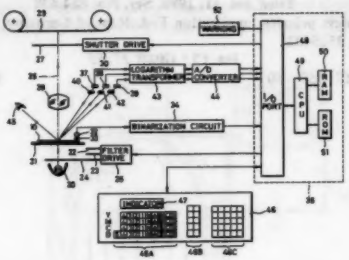
1. A photographic printer comprising:
an image pick up unit for picking up an image of a film to be printed;
an image photometric measuring means for photometrically measuring the image of the film in a large number of segments;
a display means for displaying the image of the film according to image signals outputted from said image pick up unit at a brightness level obtained by using an exposure amount calculated with a first exposure amount operational formula according to image signals outputted from said image photometric measuring means;
a key input means for inputting a classification information of the image of the film according to a visual inspection of the displayed image so as to select one of the plurality of second exposure amount operational formulas;
an image data analyzing means for obtaining image characteristic values from image data transmitted from said image photometric measuring means;
an operational means for determining a printing exposure amount, which comprises a means for obtaining a correction amount by substituting said image characteristic values for the selected second exposure amount operational formula and a means for obtaining the printing exposure amount by adding said correction amount to exposure amount calculated with the first exposure amount operational formula; and
an exposure control means operatively connected to said operational means for exposing a photographic paper according to the determined exposure amount.

4,707,120
METHOD AND APPARATUS FOR EXPOSURE CORRECTION IN COLOR PRINTING FROM EXPOSED PHOTOGRAPHIC COLOR FILM

Takashi Yamamoto, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 9, 1986, Ser. No. 917,191
Claims priority, application Japan, Oct. 9, 1985, 60-225299; Oct. 9, 1985, 60-225301
Int. Cl.[4] G03B *27/80*
U.S. Cl. 355—38 **7 Claims**

1. An exposure correction method for photographic color printing of the type in which three primary color exposures are controlled so as to perform standard exposure for a standard frame of a specific type of color film, said film having a coded mark thereon indicating said film type; said method comprising
establishing film type-dependent correction values which are based on available color films relative to said specific type of color film;
determining frame-dependent correction values according to the differences in color balance and in density of a frame of said color film from said standard frame;
reading said coded mark of said color film to retrieve one of said film type-dependent correction values;
adding said frame-dependent correction values to said retrieved film type-dependent correction value to obtain a total correction value for each color;

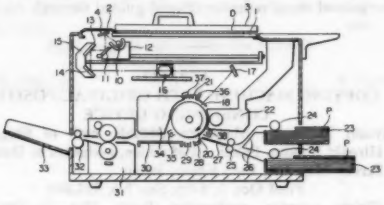


correcting said standard exposure by the amount of said total correction value; and
making a color print using the thus-corrected standard exposure.

4,707,121
COPYING APPARATUS

Akira Sawaki, and Seitaro Kasahara, both of Hachioji, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Jan. 13, 1986, Ser. No. 818,619
Claims priority, application Japan, Jan. 17, 1985, 60-6135; Jan. 28, 1985, 60-13863; Jan. 28, 1985, 60-13864; Jan. 28, 1985, 60-13865; Jan. 28, 1985, 60-13869
Int. Cl.[4] G03B *27/52*
U.S. Cl. 355—40 **7 Claims**



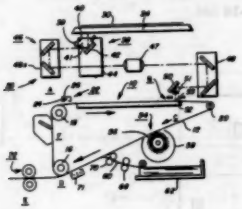
1. An apparatus for recording an image comprising;
a platen adapted for setting thereon a document having one kind of sheet size,
display means for displaying additional information in the proximity of said platen,
light source means for exposing said platen and said display means such that reflected light from said platen and said display means includes a document image and an image of the additional information,
optical means for projecting an image formed by the reflected light from said platen and said display means, and
recording means for recording said projected image on a recording sheet,
wherein said optical means includes means for changing magnification of the projected image so that both an image of said document image and the additional information image can be recorded on a recording sheet having the same sheet size as the document.

4,707,122

METHOD AND APPARATUS FOR ELIMINATING EXPOSURE STROBING EFFECTS IN A DOCUMENT REPRODUCTION MACHINE

William L. Lama, and Robert P. Loce, both of Webster, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Sep. 24, 1986, Ser. No. 910,708
Int. Cl.[4] G03B 27/72
U.S. Cl. 355—71 4 Claims



1. In a document scanning system wherein a plurality of optical components illuminates a document on an object plane and projects an image thereof along an optical path onto a photoconductor moving at a predetermined speed, the incident irradiance profile at the photoreceptor having a spatial variation across the surface defined by the expression $H_1(x)$,

said system acquiring, during scan, a speed vibration of frequency f, giving rise to an exposure modulation at the photoreceptor surface given by the expression:

$$M = m\frac{|\tilde{H}(f/V_0)|}{\tilde{H}(o)}$$

where m (the magnitude of the velocity modulation)$=2\pi f\Delta/V_o$, V_o is the average process velocity, Δ is the amplitude of the spatial vibration and $\tilde{H}(f/V_o)$ is the Fourier transform of the illumination profile at the strobing spatial frequency, the improvement comprising a variable density filter disposed along the optical path having transmission characteristics such that the Fourier transformed function $\tilde{H}_1(f/V_o)$=zero.

4,707,123

FILM END HOLDING DEVICE

Tsutomu Ueyama, Yawata, Japan, assignor to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan

Filed Jun. 2, 1986, Ser. No. 869,654
Claims priority, application Japan, Jun. 3, 1985, 60-120784
Int. Cl.[4] G03B 27/60
U.S. Cl. 355—73 3 Claims

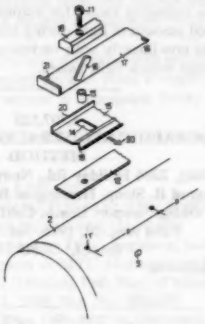
1. A film end holding device comprising a film holding plate (15), an operating plate (17), a plurality of guide bushes (13) and a contact member (18), each provided on a portion of a drum (2) near an end of a film (1) mounted on a periphery of the drum being taken up thereon, and wherein;

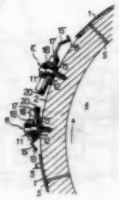
said holding plate (15) has a plurality of guide slots (14) in the circumferential direction of the drum (2), an extending side of the holding plate (15) opposed to the end of the film (1) is formed into an angular portion with its front end bent to be a film contact section (19), while the opposite extending side being bent to be a turnup (20);

said operating plate (17) has a plurality of guide slots (16) oblique to an axial direction of the drum (2) for sliding movement within bent portions of the holding plate (15) in the axial direction of the drum;

said contact member (18) of sufficient rigidity fixed to the drum (2) by engaging said guide slots (14),(16) of the holding plate (15) and the operating plate (17) with said bushes (13) so that the holding plate (15) may slide in the circumferential direction on the surface of the drum while holding the operating plate (17) inside by means of a plurality of set bolts (11) through said guide bushes (13); and

said operating plate (17) moving obliquely when pushed in the axial direction of the drum, whereby the holding plate





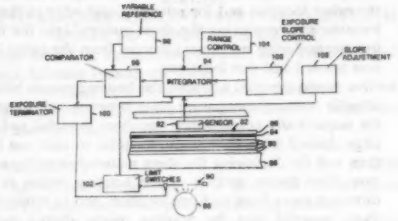
(15) moves in the circumferential direction of the drum (2) by a length of the guide slot (14) and the operating plate (17) runs on the angle portion of the holding plate (15) so that the end of the film (1) may be held by curving the contact member (19) of the holding plate (15) toward the surface of the drum (2).

4,707,124

APPARATUS FOR EXPOSING PHOTOSENSITIVE MEDIA

Duane B. Hickey, and Robert V. Hickey, both of Corvallis, Oreg., assignors to CH$_2$M Hill, Inc., Corvallis, Oreg.

Filed Sep. 3, 1985, Ser. No. 772,172
Int. Cl.[4] G03B 27/80
U.S. Cl. 355—83 17 Claims



1. An apparatus for exposing photosensitive media to a source of light comprising light sensing means for receiving light from the source during exposure of the photosensitive media, said light sensing means being positioned to receive

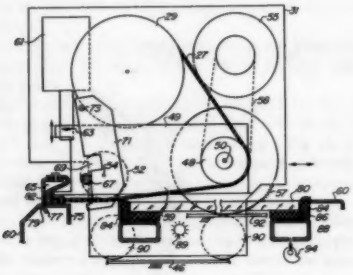
light from the source which passes through data free areas of one or more original sheets or samples thereof, said apparatus also including light monitoring means for monitoring the light received by the light sensing means and for automatically stopping the exposure of the photosensitive media upon the sensing of a predetermined amount of light, the light monitoring means including means for automatically varying the predetermined amount of light during exposure of the photosensitive media non-linearly with variations in the density of originals through which light passes.

4,707,125

PHOTOGRAPHIC REGISTRATION APPARATUS AND METHOD

Ernest Ohlig, 2306 Holiday Rd., Newport Beach, Calif. 92660, and Conrad B. Sloop, Huntington Beach, Calif., assignors to Ernest Ohlig, Newport Beach, Calif.

Filed Aug. 29, 1986, Ser. No. 902,148
Int. Cl.[4] G03B *27/20*
U.S. Cl. 355—94 **6 Claims**



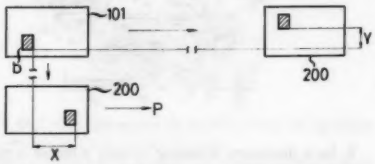
1. Improved vacuum blanket apparatus comprising:
an exposure plate for passing optical radiation therethrough;
support means for said plate;
housing means disposed to move on said support means over said exposure plate in a plane substantially parallel therewith between one location near an edge of the exposure plate and a remote location near another edge of the exposure plate substantially opposite the one location;
a length of flexible, impervious sheet material having length and width dimensions sufficient to substantially cover the exposure plate, said sheet material being supported for transport within the housing means and for selective deployment from and retrieval into the housing means;
latching means coupleable to an edge of the sheet material and to the housing means for selectively fixing said edge of the sheet material near an edge of the exposure plate at one location to deploy the sheet material over the exposure plate during movement of the housing means toward the other location and for releasing said edge at the one location after retrieving the sheet material into the housing means during movement thereof from the other location toward said one location;
motive means coupled to move the housing means bidirectionally across the exposure plate between said locations for sequentially transporting the sheet material and said edge thereof from the remote location to said one location, and for deploying the sheet material over the exposure plate during motion of the housing means in one direction away from said one location, and to retrieve the sheet material into the housing means during motion thereof in the opposite direction toward said one location, and for transporting the sheet material and said edge thereof from the one location to the remote location; and
pumping means connected to evacuate air from the region beneath the sheet material.

4,707,126

METHOD OF POSITIONING ORIGINAL IMAGE TO BE COPIED AND APPARATUS FOR PERFORMING THE SAME

Kiyoshi Ohshima; Shigeru Suzuki; Harumitsu Mashiko, and Eisyu Ohdake, all of Yokohama, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Jul. 12, 1985, Ser. No. 754,842
Claims priority, application Japan, Jul. 13, 1984, 59-144138; Jul. 20, 1984, 59-149307; Jul. 21, 1984, 59-150482
Int. Cl.[4] G03G *15/00*
U.S. Cl. 355—14 SH **20 Claims**



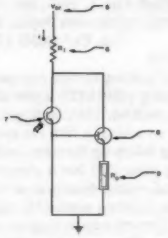
1. A method of shifting a copying position of an image on an original sheet to be copied by a copying machine to a desired position on a copy sheet during a copying operation of said copying machine, including illuminating said original sheet by an illuminating device moving relatively thereto to expose a photosensitive member to thereby form an electrostatic laent image thereon, developing said electrostatic latent image with toner and transferring the image onto said copy sheet, said method comprising the step of regulating a position of said image of said original sheet by means of a position setting means in at least one of a copy sheet feeding direction to said photosensitive member and a direction orthogonal to said copy sheet feeding direction to set a visible image forming position on said copy sheet.

4,707,127

AUTO-WIRELESS SHUTTER RELEASE CONTROL

Kenneth D. Goedken, 578 Hawkeye Ct., Iowa City, Iowa 52240

Filed Feb. 7, 1986, Ser. No. 827,381
Int. Cl.[4] G03B *17/38*
U.S. Cl. 354—266 **3 Claims**

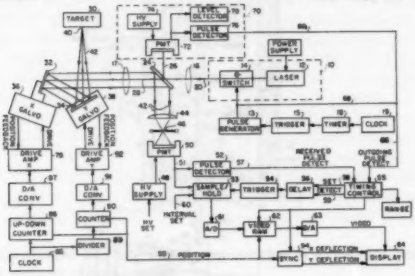


1. An automatic wireless remote control device which employs a switching mechanism to control a camera or the like, comprising emitter means for emitting a signal, receiver means for receiving the emitted signal comprising a power source, a resistor connected to the power source a phototransistor connected to the resistor, and a series circuit consisting of a second transistor and a solenoid connected in parallel with said phototransistor, the base of said second transistor being connected to ground.

4,707,128
TURBID MEDIA VIEWING SYSTEM

Bryan W. Coles, San Diego, Calif., assignor to Subsea Engineering Associates, Inc., San Diego, Calif.

Filed Dec. 31, 1984, Ser. No. 687,989
Int. Cl.[4] G01C *3/08*
U.S. Cl. 356—4 **19 Claims**

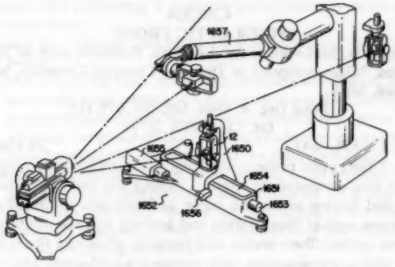


1. A viewing system for use in turbid media comprising:
light pulse emitting means for emitting a pulse of light;
beam splitter means for receiving the emitted light pulse from the emitting means, for transmitting at least a portion of the emitted light received, and for deflecting a return reflected light pulse;
controllable biaxial scanning means for receiving the transmitted light pulse from the beam splitter and directing the transmitted light pulse to a target to sequentially illuminate the target, for receiving the reflected light pulse from the target, and deflecting said reflected light pulse back to the beam splitter; and
receiver means for receiving the reflected return light pulse after deflection from the beam splitter and for providing or producing a signal representative of the intensity of said light pulse.

4,707,129
THREE DIMENSIONAL POSITION MEASUREMENT SYSTEM USING AN INTERFEROMETER

Ichiro Hashimoto, Hachioji, and Katsushige Nakamura, Mitaka, both of Japan, assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed May 10, 1985, Ser. No. 733,558
Claims priority, application Japan, May 11, 1984, 59-93929
Int. Cl.[4] G01B *9/02*
U.S. Cl. 356—4.5 **13 Claims**

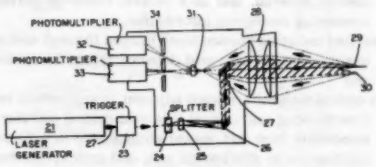


1. An improved interferometer of the type in which beam generating section having a first source of coherent collimated light produces a first beam of light that is divided at a first beam splitter into a reference beam that is directed along a reference path and a test beam that is directed in a variable first direction to a movable reflecting section, said movable reflecting section directing the test beam back to a point F at which the reference and test beams are recombined to produce an interfering output beam, said improvement comprising:
means for controlling the first direction so that the test beam is incident on the movable reflecting section even when the movable reflector section is translated freely in three dimensions;
means for controlling the movable reflecting section so that said test beam is directed back to point F even when the movable reflecting section is translated freely in three dimensions; and
means for measuring the direction of the test beam.

4,707,130
METHOD AND APPARATUS FOR THE OPTICAL MEASUREMENT OF FLUID FLOW

Jörg Hofmann, Munich, and Kurt Ding, Augsburg, both of Fed. Rep. of Germany, assignors to MTU Motoren-und Turbinen-Union Munchen GmbH, Munich, Fed. Rep. of Germany

Filed Dec. 21, 1984, Ser. No. 684,605
Claims priority, application Fed. Rep. of Germany, Dec. 24, 1983, 3347092
Int. Cl.[4] G01P *3/36, 5/22*
U.S. Cl. 356—28 **12 Claims**



3. Apparatus for optically measuring the cyclic flow of a fluid containing stray particles comprising means for producing first and second light beams, said first beam being a fixed start beam, said second beam being a stop beam rotating in oscillating fashion in discrete angular steps around said fixed beam as a center, a plurality of measuring windows through each of which two respective start and stop beams pass to illuminate particles in a cyclic fluid flow, means for optically measuring test data by sensing transit time and distribution of the particles in the fluid at each window by the respective start and stop beams, means for converting the optical signals into electrical signals, and electtrical circuit means including counter means and comparators equal in number to said windows and operatively associated therewith for producing output signals when the respective comparators receive signals equal in number to a pre-set minimum.

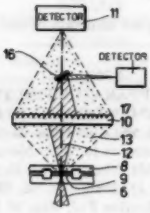
4,707,131
OPTICAL ARRANGEMENT FOR PHOTOMETRICAL ANALYSIS MEASURING DEVICES

Oswald Schiek, 3, Fritz-Reuter-Strasse, 6900 Jena, District of Gera, German Democratic Rep.

Filed Oct. 15, 1985, Ser. No. 786,994
Claims priority, application German Democratic Rep., Nov. 1, 1984, 268965; Mar. 1, 1985, 273669
Int. Cl.[4] G01N *21/17*
U.S. Cl. 356—73 **10 Claims**

1. An optical arrangement in a photometrical measuring device for analyzing a sample material, comprising
a light emitting system for emitting a bundle of monochromatic radiation to propagate along an optical axis, said light emitting system having a field aperture for said monochromatic radiation,
a lens,
a sample mount for mounting a material to be analyzed,

an optical imaging system,
a detector means,
said lens, said sample mount, said optical imaging system and said detector means being sequentially arranged in that order along said optical axis in mutual optical alignment,
said optical imaging system having an aperture greater than that of the field aperture,
said monochromatic radiation being focused onto a sample on said sample mount for producing a sample material radiation,



said sample material radiation being composed of a first radiation portion containing measuring information of said sample material, and of a second radiation portion not containing measuring information,
said first radiation portion being imaged through said optical imaging system onto said detector means for evaluation, and
an optical member arranged adjacent to said optical imaging system along said optical axis, said optical member being removable from said optical arrangement in a direction at right angles to said optical axis, said optical member covering a portion of said optical imaging system.

4,707,132

PROCESS FOR SENSING DEFECTS ON A SMOOTH CYLINDRICAL INTERIOR SURFACE IN TUBING

G. Wayne Dutton, 7010 Weld Co. Rd. 1, Longmont, Colo. 80501

Filed Aug. 5, 1985, Ser. No. 762,370
Int. Cl.[4] G01N *21/47*
U.S. Cl. 356—241 **12 Claims**

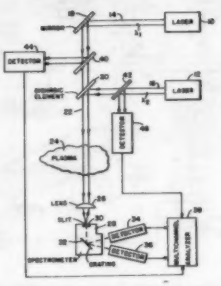
1. A process for measuring roughness of an inside cylindrical surface of metal tubing, wherein said surface is a high-precision smooth surface which may have defects randomly distributed thereon, comprising the steps of:
(a) producing a light beam having a diameter at least equal to the inner diameter of said tubing;
(b) directing said beam so that it enters and travels through the tubing where it impinges on defects on said cylindrical surface, causing generation of surface scattered light components;
(c) collecting only said surface scattered light components at a location outside said tubing; and
(d) generating and displaying a scattered light component signal providing information as to the surface roughness of said surface.

4,707,133

APPARATUS FOR PLASMA DIAGNOSTICS

Thomas G. Roberts, Huntsville; Raymond W. Conrad, Russellville, and Thomas E. Honeycutt, Somerville, all of Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 6, 1986, Ser. No. 841,497
Int. Cl.[4] G01J *3/42*
U.S. Cl. 356—320 **6 Claims**



1. Diagnostic apparatus comprising: first and second tunable lasers for providing first and second output beams, optical means adjacent said lasers for bringing together and collimating the two laser beams and directing the beams along a path through a space, receiving means in the path of said two laser beams for selecting the two laser beams from extraneous radiation and separating the composite beams into first and second beampaths, said receiving means being on the opposite side of the space from said optical means, first and second detectors in respective beampaths, each detector being for receiving the respective laser beam and providing an electrical output indicative of the beam intensity, signal processing means coupled to receive said electrical outputs for combination to provide an indication of relative changes in intensity between the first and second beams after their passage through said space, and a plasma in said space and wherein said first and second lasers are tuned to respective adjacent wavelengths so that the wavelength from said first laser is tuned to a spectral region near a predetermined first electronic transition frequency present in said plasma, and second laser is tuned to substantially coincide with said electronic transition frequency present in said plasma, thereby allowing different ionic species of the plasma to be sampled.

4,707,134

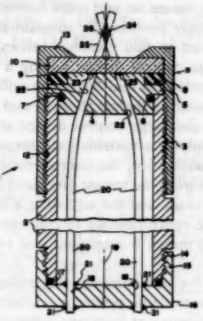
FIBER OPTIC PROBE

Richard D. McLachlan, and Leslie D. Rothman, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 4, 1984, Ser. No. 678,115
Int. Cl.[4] G01N *21/49*
U.S. Cl. 356—342 **24 Claims**

1. A fiber optic probe comprising a housing having a longitudinal axis; a transparent window closing one end of said housing and having inner and outer surfaces; and a plurality of elongate optical fibers within said housing and constituting all of the optical fibers within said housing, all of said fibers having their corresponding ends terminating adjacent and confronting the inner surface of said window and extending in a direction away from said window through and outwardly of said housing, said corresponding ends of all of said fibers being radially spaced from the axis to said housing and circumferentially spaced from one another, said corresponding ends of all

of said fibers having their longtitudinal axes converging toward one another in a direction toward the outer surface of



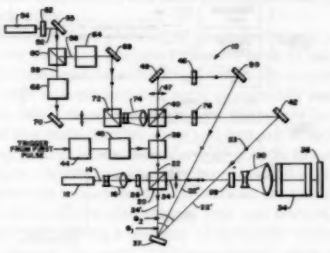
said window and intersecting one another at a common point on the axis of said housing.

4,707,135

APPARATUS AND METHOD FOR THE RECORDING AND READOUT OF MULTIPLE EXPOSURE HOLOGRAMS

David M. Swain, Thousand Oaks, Calif., and Richard J. Tansey, Boxford, Mass., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Jan. 10, 1986, Ser. No. 818,525
Int. Cl.[4] G01B 9/025
U.S. Cl. 356—347 **30 Claims**



1. An apparatus for the recording and readout of multiple-exposure holograms, comprising:

means for producing a multiple-pulsed linearly polarized laser beam;

means for rotating the plane of polarization of said laser beam;

a first polarizing beam splitter for dividing said pulsed laser beam into a test beam and a reference beam after the plane of polarization of said laser beam is rotated, said means for rotating the plane of polarization producing an intensity ratio between the test beam and the reference beam;

means for directing the test beam toward a test medium and then to a recording medium, said means for directing the test beam including means for producing a circularly polarized beam for efficient transmission of the test beam to said recording medium;

at least one means for rapidly and selectively switching the plane of polarization of the reference beam;

at least a second polarizing beam splitter for providing at least a first recording reference beam and a second recording reference beam, said first and second recording reference beams being separated in time, the reference beam divided from the pulsed laser beam being directed into said first and second recording reference beams after its plane of polarization is selectively switched;

means for directing said first recording reference beam and said second recording reference beam toward the recording medium at different angles;

means for rotating the plane of polarization of either the test beam or the recording reference beams to produce identical planes of polarization of the test beam and all recording reference beams whereby at least two holograms are recorded and developed on the recording medium; and

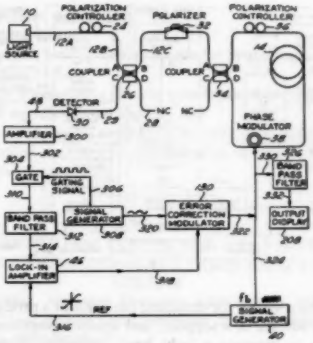
means for measuring optical path differences between the recorded wavefronts stored in the holograms.

4,707,136

GATED FIBER OPTIC ROTATION SENSOR WITH LINEARIZED SCALE FACTOR

Byoung Y. Kim, Stanford, Calif., assignor to Stanford University, Stanford, Calif.

Continuation-in-part of Ser. No. 488,155, Apr. 25, 1983, Pat. No. 4,637,722. This application Feb. 17, 1984, Ser. No. 581,303
Int. Cl.[4] G01C 19/64
U.S. Cl. 356—350 **33 Claims**



1. A method of determining the rotation rate of an optical loop having counter-propagating light waves which are phase modulated at a first frequency and which are combined to form an output signal, wherein the method comprises the steps of:

blanking at least a component of the output signal at selected times to provide a gated signal;

applying a phase-ramp modulation to the counter-propagating light waves during at least a portion of a period of a second, substantially fixed frequency so as to apply a substantially DC phase bias to the counter-propagating light wave phase difference and to substantially null a component in the gated signal which is produced by loop rotation; and

measuring the amount of phase bias to determine the rotation rate.

4,707,137

DEVICE AND METHOD FOR TESTING THE WAVE FRONT QUALITY OF OPTICAL COMPONENTS

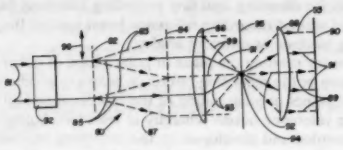
Wai-Hon Lee, Cupertino, Calif., assignor to Laser Magnetic Storage International Company, Colorado Springs, Colo.

Filed Oct. 25, 1985, Ser. No. 791,421
Int. Cl.[4] G01B 9/02
U.S. Cl. 356—353 **13 Claims**

4. A device for testing the wavefront quality of an optical component under test, the device comprising:

a light source on one side of the optical component for passing a beam therethrough;

a first grating on the other side of the optical component for receiving the beam thereon, the grating diffracting the beam into three main diffracted orders; and



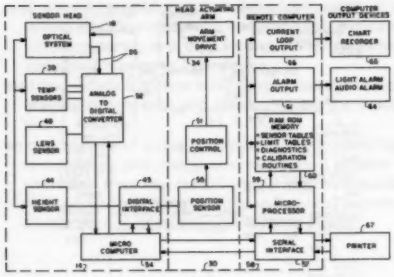
quadrant detector means for viewing overlapping interference fringes of the three diffracted beams.

4,707,138

COLOR MEASURING AND CONTROL DEVICE

Charles W. Coatney, Reno, Nev., assignor to Filper Industries, Inc., Reno, Nev.

Filed Jun. 3, 1985, Ser. No. 740,622
Int. Cl.[4] G01J 3/46; G01N 21/27
U.S. Cl. 356—402 **2 Claims**



1. A color sensor for detecting the color of a product carried on a top surface of a support, said sensor comprising:

means to generate a light beam including selected color wavelengths,

a head for transmitting said light beam onto said product,

means supporting said head for translating movement over said support top surface along a path generally parallel to said top surface,

detector means in said head for detecting the reflected light from said product,

means to analyze said reflected light to generate an output signal responsive to the color of said product;

means for generating a distance signal responsive to the distance between the product and said head, and

means to modulate said output signal responsive to said distance signal to adjust for light changes due to changes in the distance between the product and the head.

4,707,139

CONTROL SYSTEM AND METHOD FOR CONTINUOUS MIXER WITH MOVING SURFACE DISCHARGE DEVICE

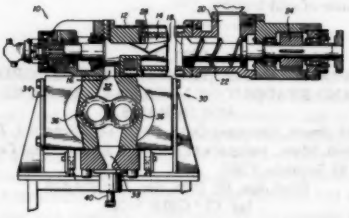
David Valenzky, Southbury, Conn., and Gary T. Markhart, Carlsbad, Calif., assignors to Farrell Corporation, Ansonia, Conn.

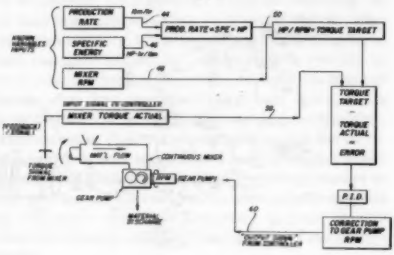
Filed Nov. 22, 1985, Ser. No. 801,146
Int. Cl.[4] B28C 7/16
U.S. Cl. 366—77 **16 Claims**

6. An improved apparatus for continuously processing thermoplastic material under controllable power, the apparatus including a barrel forming at least one substantially cylindrical material working chamber having material charging orifice adjacent one end and a material discharge orifice adjacent the other end, means for substantially continuously feeding material to said chamber through said charging orifice at a controllable rate, a mixing motor extending axially in said chamber, means for rotating said rotor, said rotor having axially extending blade portions, means on said rotor between said charging orifice and said blade portions for substantially continuously pushing material fed to said chamber toward said discharge orifice, a discharge control device having a moving surface and an inlet connecting to said discharge orifice for engaging moving material entering therein through said inlet, and means for adjusting said discharge control device at a variably controlled rate for applying a variable back pressure to the material fed through said orifice, the improvement comprising:

means for monitoring the torque produced by the means for rotating said rotor and for adjusting a discharge rate of said discharge control device to maintain the torque produced by the means for rotating said rotor at a chosen target torque.

16. A method for continuously processing thermo-plastic material under controllable power in a continuous mixer including a barrel forming at least one substantially cylindrical





material working chamber having a material charging orifice adjacent one end and a material discharge orifice adjacent the other end, means for substantially continuously feeding material to said chamber through said charging orifice at a controllable rate, a mixing rotor extending axially in said chamber, means for rotating said rotor, said rotor having axially extending blade portions, means on said rotor between said charging orifice and said blade portions for substantially continuously pushing material fed to said chamber toward said discharge orifice, a discharge control device having a moving surface and an inlet connecting to said discharge orifice for engaging moving material entering therein through said inlet, and means for adjusting said discharge control device at a variably controlled rate for applying a variable back pressure to the material fed through said orifice, said method comprising the steps of:

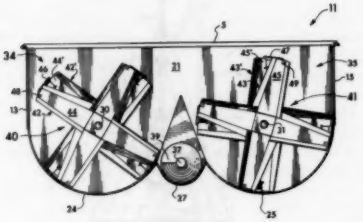
monitoring the torque produced by the means for rotating said rotor and

adjusting a discharge rate of said discharge control device to maintain the torque produced by the means for rotating said rotor at a chosen target torque.

4,707,140
FEED MIXER

Harry Mohrlang, Brush, Colo., assignor to Mohrlang Manufacturing, Inc., Brush, Colo.

Filed Sep. 29, 1986, Ser. No. 912,924
Int. Cl.[4] B01F 7/04, 15/02
U.S. Cl. 366—186 30 Claims



1. A mixer primarily intended for use as a feed mixer for cattle and other livestock, said mixer including:

a mixing tank having forward and rearward walls, a bottom wall, and opposite side walls, said bottom wall having a first relatively large curved wall portion extending along a first substantially horizontal axis and defining the bottom of a first chamber, a second relatively large curved wall portion extending along a second substantially horizontal axis and defining the bottom of a second main chamber, and a third relatively small curved wall portion along a third substantially horizontal axis and defining the bottom of an auxiliary chamber, said auxiliary chamber being positioned between said first and second main chambers with said first, second, and third axes substantially parallel to each other,

a first rotor having a plurality of elongated mixing paddles adjacent the outer periphery thereof, each of said elongated mixing paddles extending substantially between said side walls wherein said first rotor substantially assumes a paddle wheel shape, and means for rotating said first rotor in said first main chamber about said first axis to move said mixing paddles across said first wall portion toward said auxiliary chamber, said first rotor having a diameter wherein said mixing paddles travel in an arc substantially conforming to and adjacent said first wall portion,

a second rotor having a plurality of elongated mixing paddles adjacent the outer periphery thereof, each of said elongated mixing paddles extending substantially between said side walls wherein said second rotor substantially assumes a paddle wheel shape, and means for rotating said second rotor in said second main chamber about said second axis to move said mixing paddles across said second wall portion toward said auxiliary chamber, said second rotor having a diameter wherein said mixing paddles travel in an arc substantially conforming to and adjacent said second wall portion,

said first rotor having first and second rotor sections spaced from each other along said first axis, means for supporting said elongated mixing paddles between said first and second rotor sections at a slight acute angle to said first axis wherein the mixing paddles of the rotating first rotor will impart an axial component of movement to the feed along said first axis, and means for pivotally mounting each of said elongated mixing paddles between said first and second rotor sections for pivotal movement about respective axes relative to said first and second rotor sections, and

an auger and means for rotating said auger in said auxiliary chamber adjacent said third wall portion to move feed axially of said auger along said third axis.

4,707,141
VARIABLE COLOR ANALOG TIMEPIECE

Karel Havel, 15 Kensington Road, Apt. #704, Bramalea, On, Canada L6T 3W2

Continuation-in-part of Ser. No. 817,114, Jan. 8, 1986, Pat. No. 4,647,217. This application Jan. 6, 1987, Ser. No. 667
Int. Cl.[4] G04B 47/06; G04C 19/00
U.S. Cl. 368—11 7 Claims

1. A timepiece comprising:

timekeeping means;

variable color analog display means for providing an analog indication of time;

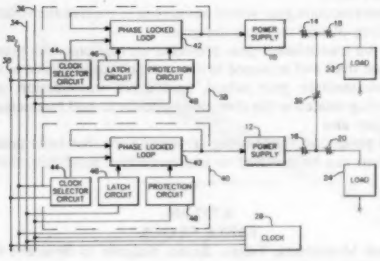
means for measuring a diverse quantity and for developing output signals related thereto; and

color control means responsive to said output signals for controlling the color of said indication in accordance with said diverse quantity.

4,707,142
MASTER CLOCK SYSTEM FOR A PARALLEL VARIABLE SPEED CONSTANT FREQUENCY POWER SYSTEM

Donal E. Baker, American Township, Allen County, and Mirza A. Beg, Lima, both of Ohio, assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 5, 1986, Ser. No. 938,652
Int. Cl.[4] G04C 11/00; H02J 1/00
U.S. Cl. 368—46 7 Claims



1. A clock control system for an electric power system comprising:

means for generating a master clock signal;

means for generating a first signal for controlling a first channel of an electric power system, said first signal being initially phase locked to said master clock signal;

means for generating a second signal for controlling a second channel of an electric power system, said second signal being initially phase locked to said master clock signal;

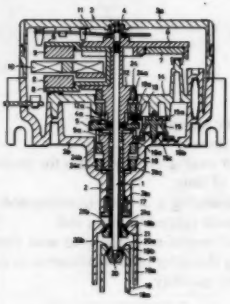
means for monitoring the frequency of said master clock signal;
means for decoupling said first and second signals from said master clock signal when said master clock signal is out of a preselected frequency range;
means of operating the decoupled first signal at a preselected frequency to produce a backup clock signal; and
means for phase locking the decoupled second signal to said backup clock signal.

4,707,143

DEVICE FOR DRIVING TWIST PENDULUMS

Masao Hanya, Tokyo, Japan, assignor to Seikosha Co., Ltd., Tokyo, Japan

Filed Oct. 6, 1986, Ser. No. 915,808
Claims priority, application Japan, Oct. 7, 1985, 60-222995
Int. Cl.[4] G04B *17/02*
U.S. Cl. 368—165 **1 Claim**



1. A device for driving twist pendulums comprising:
a pendulum shaft operating as a driving shaft;
a pipe-like pendulum shaft arranged concentrically with said pendulum shaft:
a driving wheel provided on said first-mentioned pendulum shaft and arranged to be driven to rotate forwardly by the magnetic force between a magnet and a driving coil and to be driven to rotate reversely by the spring force of a hair spring;
a transmission gear provided on said first-mentioned pendulum shaft;
an intermediate gear wheel connected to receive the rotating force of said transmission gear;
a drive transmission gear provided on said pipe-like pendulum shaft and arranged to receive the rotating force of said intermediate gear wheel, said drive transmission gear being rotated in the direction opposite to said transmission gear; and
said pendulum shafts being arranged such that twist pendulums can be attached to said respective pendulum shafts.

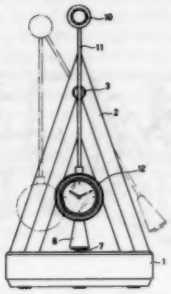
4,707,144

TABLE CLOCK

Masumi Mukoyama, Tokyo, Japan, assignor to Seikosha Co., Ltd., Tokyo, Japan

Filed Sep. 10, 1986, Ser. No. 905,939
Claims priority, application Japan, Sep. 11, 1985, 60-139345[U]
Int. Cl.[4] G04F *5/00*
U.S. Cl. 368—165 **14 Claims**

1. A table clock comprising:
a base;
a support body disposed vertically on the base;
a first pole member swingably supported at its middle portion by said support body;
electromagnetic means including a driving coil provided in the base and a permanent magnet provided at the lower end portion fo the first pole member for driving the first pole member to swing the same about its middle portion;
a second pole member swingably supported at its upper end portion by said first pole member; and



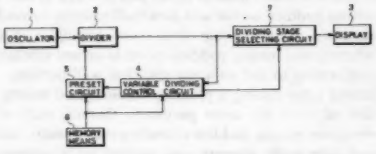
a clock body secured to the lower end portion of the second pole member such that as the first pole member is driven to undergo swinging movement by the electromagnetic means, the second pole member is also swung abouts its upper end portion thereby reciprocatingly displacing the clock body transversely of the support body without changing the vertical posture of the clock body.

4,707,145

ELECTRONIC TIMEPIECE

Takashi Ishida, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Tokyo, Japan

Filed Dec. 15, 1978, Ser. No. 968,689
Claims priority, application Japan, Dec. 12, 1977, 52-149485
Int. Cl.[4] G04B *17/12*
U.S. Cl. 368—201 **4 Claims**



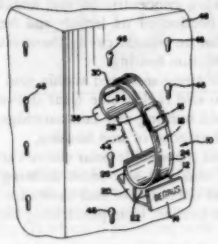
1. An electronic timepiece comprising: an oscillator for generating a time standard signal; a variable divider for dividing the time standard signal, said variable divider comprising a predetermined number of dividing stages for dividing the oscillator time standard signal, and one additional dividing stage connected to the last one of said predetermined number of dividing stages for use when the oscillator time standard signal is higher than a predetermined standard frequency; a preset circuit connected to said variable divider for presetting the dividing stages; a display device for displaying time information; memory means for storing signals corresponding to a preselected time adjustment to be made when the oscillator time standard signal is higher than said predetermined standard frequency and for applying such signals to said preset circuit; selecting means for selecting one of the outputs of the dividing stages of said variable divider and applying the selected output to said display device in accordance with the output of said memory means; and means for controlling operation of said preset circuit in accordance with the output of said one additional dividing stage.

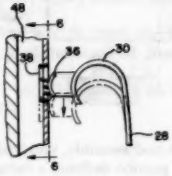
4,707,146

DISPLAY DEVICE FOR WRISTWATCHES AND WRISTBANDS

Irving L. Wein, 3750 N. Lake Shore Dr., Chicago, Ill. 60613

Filed Apr. 8, 1986, Ser. No. 849,432
Int. Cl.[4] G04B 37/00; A47F 7/00
U.S. Cl. 368—316 1 Claim





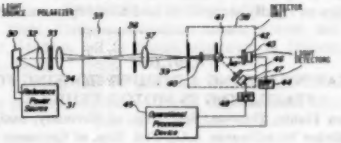
1. A display device for effectively displaying either (a) a wristwatch with its associated watch band in largely extended and readily visible form, or (b) a wristband in largely extended and in readily visible form, comprising: a generally L-shaped base member having a front terminal edge and a side edge, a face plate extending from said front terminal edge, an upwardly-extending connecting wall formed along said side edge and defining a lower passage above said base member and bordered on one side by a connecting wall having a top face, an inverted generally C-shaped body portion having a bottom curved section and a top curved section, said bottom curved section being positioned on the top face of said connecting wall, said C-shaped body portion being positioned on said base member at an angle whereby said bottom curved section is forward of the top curved section of said C-shaped body portion, the central section of said C-shaped body portion having a width sufficient to allow a wristwatch and its associated watch band to be readily and visibly displayed while at the same time enabling said C-shaped body portion to be flexed to accommodate wristbands of various lengths and types, a generally U-shaped bracket positioned along an outer side member of said top curved section of said C-shaped body portion, said top curved section having an extension, a member positioned with said top curved section to form an upper passage, said lower and upper passages permitting lateral sliding of a watchband or a wristband onto said C-shaped body portion, said display device being supportable with essentially equal facility on either a horizontal, or a nearly horizontal, surface, or a vertical or slanted surface.

4,707,147

DEVICE FOR MEASURING PLASMA PROPERTIES

Yoshiaki Aoki; Naoyuki Kayukawa; Hatsuo Yamazaki; Yasutomo Ozawa, and Hiroki Kitagawa, all of Sapporo, Japan, assignors to Hokkaido University, Sapporo, Japan

Filed Dec. 30, 1985, Ser. No. 815,071
Claims priority, application Japan, Feb. 19, 1985, 60-29407
Int. Cl.[4] G01J 5/58; G01N 21/21
U.S. Cl. 374—161 15 Claims



1. Apparatus for optically measuring the electron density and conductivity of a plasma, comprising

a source of linearly polarized light, said light being incident on said plasma;

separation means for separating light emanating from said plasma into two components;

detection means for detecting said two light components;

analyzer means interposed between said separation means and said detection means for measuring the Faraday angle of said plasma; and

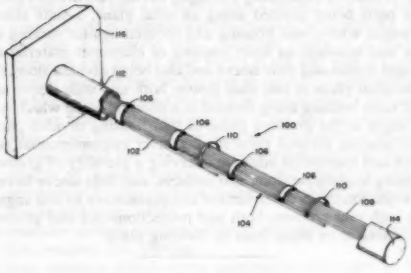
processing means coupled to said detection means for measuring the electron density and conductivity of said plasma, said electron density and conductivity being determined, for plasma electrons having a predetermined characteristic frequency, from the Faraday rotation angle of said plasma as measured by said analyzer means.

4,707,148

TEMPERATURE SENSING DEVICE

James C. Richmond, Maywood, N.J., assignor to Thermo Electric Instruments, Saddle Brook, N.J.

Filed Apr. 2, 1986, Ser. No. 847,212
Int. Cl.[4] G01K 1/14, 1/16
U.S. Cl. 374—208 11 Claims



1. A temperature sensing device for monitoring the temperature at a location along the length of an elongated conduit, said temperature sensing device comprising a support means extendable within said conduit, temperature sensing means extendable within said conduit and having an end portion movable between a first position adjacent said support means and a second position in forceable contact with an inner wall of said conduit for monitoring the temperature thereat, and a thermal element constructed of a memory metal having a transition temperature attached between said support means and said temperature sensing means, said thermal element having first

and second clips rigidly secured to said element each at opposite ends by means of an associated extending clip tab which tab is brazed to said memory metal element at said ends, with each of said clips having a "C" shaped portion coupled to said associated tab with said "C" shaped portion of said first clip encircling said support means and with said "C" shaped portion of said second clip encircling said temperature sensing means, said thermal element outwardly moving said end portion of said temperature sensing means from said first position to said second position in response to the presence of said transition temperature within said conduit due to said encircling clips as rigidly secured to said memory metal element.

4,707,149

BEARING HAVING A DIVIDED HOUSING FOR STABILIZING IN MOTOR VEHICLE

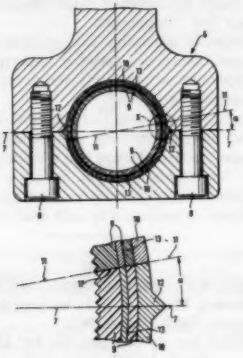
Hermann Hahle, Damme, Fed. Rep. of Germany, assignor to Lemförder Metallwaren A.G., Fed. Rep. of Germany

Filed Sep. 2, 1986, Ser. No. 902,477

Claims priority, application Fed. Rep. of Germany, Sep. 3, 1985, 3531340

Int. Cl.[4] F16C *9/02, 33/02*

U.S. Cl. 384—294 **7 Claims**



1. A bearing comprising a housing having two divided parts, said parts being divided along an axial plane, a slide sleeve arranged within said housing and secured against turning inside said housing, an inner bushing of elastomer material arranged within said slide sleeve and also being divided along the same axial plane as said slide sleeve, both said slide sleeve and said inner bushing being divided at a dividing plane which is at an angle to the dividing plane of said housing divided parts, said housing divided parts having inner circumferential surfaces and chamfered edges and having a plurality of grooves running lengthwise along said surfaces, said slide sleeve having a projection on its outer surface complementary to and engaging with said grooves, both said projections and said grooves extending at an angle from its dividing plane.

4,707,150

FLUID PRESSURE ASSISTED ROTARY SHAFT SEAL WITH GROOVED SEAL WEDGE

Rodney E. Graham, Tustin, Calif., assignor to Disposable Waste Systems, Inc., Santa Ana, Calif.

Filed Jan. 14, 1987, Ser. No. 3,334

Int. Cl.[4] F16C *33/78*

U.S. Cl. 384—481 **10 Claims**

1. In a fluid pressure assisted rotary shaft seal assembly for sealing a shaft supported for rotation about its axis within a housing bore by an anti-friction bearing interposed between the shaft and the housing bore, said bearing having an outer bearing race fixed to said housing and an inner bearing race fixed to the shaft and rotating therewith, said seal assembly comprising:

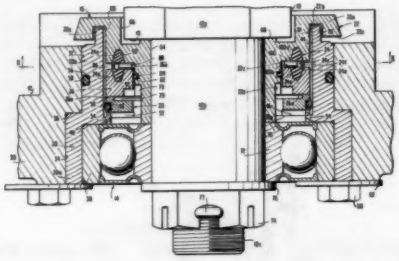
an annular bushing operatively fixed to said shaft adjacent the anti-friction bearing on the high pressure side of the housing, an annular static seal race operatively fixed to said housing and having axially opposed end faces, an annular rotating seal race operatively coupled to said shaft and having an end face sealably engageable with one opposing end face of said static seal race,

a replaceable wear sleeve cartridge fixedly mounted to said housing bore, being concentric to said annular bushing over at least a portion of its length and being spaced therefrom to define an annular cavity therebetween to the side of the anti-friction bearing,

said static seal race being mounted within said cavity and rotatably fixed to said replaceable wear sleeve cartridge,

means including said bushing and said cartridge defining a labyrinth preseal exterior of said housing,

means including said replaceable wear sleeve cartridge, said annular bushing and said seal races defining a positive fluid pressure seal internally of said cavity for preventing any exterior fluid medium from penetrating the interior of



the housing through said assembly, said bushing including a reduced diameter portion defining a radially projecting shoulder functioning as a radial end wall of said cavity, and

an elastomeric seal wedge interposed axially between said bushing shoulder and said annular rotating seal race, and wherein the axial length of the cavity, said seal races and said wedge are such that said seal wedge is placed under axial compression to resiliently bias confronting end faces of the seal races into sealing contact with each other,

the improvement further comprising: an annular radial groove within said annular elastomeric seal wedge on a radial face thereof opposite that open to the housing exterior, and an annular mechanical spring under axial compression interposed within said annular radial groove of said annular elastomeric seal wedge for exerting mechanical spring compressive force through said seal wedge toward opposite axial ends of said annular elastomeric seal wedge to facilitate the maintenance of the positive fluid pressure seal by said seal wedge between said annular bushing and said rotating seal ring and the resilient biasing of the confronting end faces of the seal races into dynamic seal contact with each other.

4,707,151

RADIAL ROLLING BEARINGS

Theodor Kaiser, Hochstadt, Fed. Rep. of Germany, assignor to INA Walzlager Schaeffler KG, Fed. Rep. of Germany

Filed Apr. 30, 1987, Ser. No. 44,991

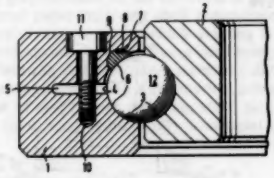
Claims priority, application Fed. Rep. of Germany, May 14, 1986, 3616244

Int. Cl.[4] F16C *33/60, 33/61*

U.S. Cl. 384—495 **2 Claims**

1. Radial rolling bearing with adjustable clearance compris-

ing two concentric races whose outer facing surface areas are each provided with a groove, the grooves defining the raceway for the rolling elements, a slot is provided in the area of the center plane of the rolling bearing extending radially from the bottom of one of the grooves over only a portion of the race depth so that the slotted race has a partial raceway at both



sides of the slot wherein the slot width is changeable by means acting on the race and causing a deformation of the race, characterized in that at least one partial raceway (6) is defined by a race wire (7) which is provided with rounded back (8) at the one side facing the race (1) and is swingably mounted relative to the race (1) in a circumferential groove (9) of the latter.

4,707,152

CAGE FOR TAPERED ROLLER BEARINGS

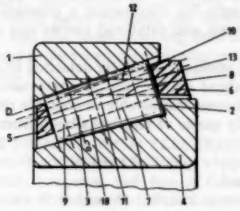
Gerhard Neese, Gressthal, Fed. Rep. of Germany, assignor to FAG Kugelfischer Georg Schafer (KGaA), Fed. Rep. of Germany

Filed Jan. 20, 1987, Ser. No. 4,659

Claims priority, application Fed. Rep. of Germany, Feb. 22, 1986, 3605812

Int. Cl.[4] F16C *33/46, 33/56*

U.S. Cl. 384—572 **12 Claims**



1. A cage for a tapered roller bearing, wherein the bearing comprises an outer ring, an inner ring radially inward of and spaced from the outer ring and a complement of tapered rollers disposed between the inner and the outer rings for rolling thereover with relative rotation of the rings, each tapered roller having a larger roller diameter section and a smaller roller diameter section and the roller tapering from the larger to the smaller diameter;

the cage for the bearing being a window cage with a plurality of pockets for receiving the rollers; the cage having a small side ring of smaller outer diameter; the cage having a large side ring of larger outer diameter; the cage having a plurality of arms spaced circumferentially around and joining the side rings, and neighboring ones of the arms defining respective pockets each for receiving a tapered roller; the arms which define a pocket for one of the rollers having respective surfaces opposite each other that face toward each other and toward the roller in the pocket;

at the surface of at least one of the arms in a pocket in the axial region generally adjoining the large side ring of the cage, the surface in that region being adapted to the profile of the roller in that in every cylindrically shaped sectional plane through the bearing, and therefore through the rollers of the bearing, and the sectional plane being parallel to the axis of the bearing, the surface being shaped so that the distance apart of the surfaces in the pocket is approximately the length of a chord of the roller in that cylindrical sectional plane in the region of the largest diameter of the roller.

4,707,153

PRINTER CONTROLLER

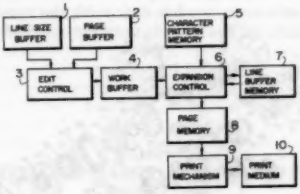
Tomoya Nishi, Hadano; Mitsuhiro Amari, Atsugi, and Kenji Suzuki, Hadano, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 17, 1986, Ser. No. 908,661

Claims priority, application Japan, Sep. 30, 1985, 60-217167

Int. Cl.[4] B41J *3/02*

U.S. Cl. 400—121 **7 Claims**



1. A printer controller operating on a printer to print characters on a printing medium by generating patterns of the characters in accordance with character codes of the characters, said controller comprising:

a line size buffer which stores line size information for character lines constituting a page of the printing medium on character line basis;

a page buffer which stores character codes of character lines to be printed in a page of the printing medium;

editing control means connected to said line size buffer and said page buffer and operative to produce combinational information from the line size information and the character codes, said editing control means comparing a line size stored in said line size buffer with a limited line size, producing a first combinational information by combining the line size information with character codes of a corresponding line in said page buffer if the line size is found smaller than the limited line size as a result of comparison, dividing the line into a plurality of lines having a line size smaller than the limited line size if the line size is found larger than the limited line size, and producing a second combinational information by combining line size information of divided lines with divisional character codes expressing divided portions in the divided line of characters in said page buffer;

a character pattern memory which stores patterns of characters available for printing;

a page memory which stores patterns of characters to be printed in a page of the printing medium;

a line buffer memory which serves as a temporary storage for writing character patterns into said page memory, said line buffer memory having a line size equal to or larger than the limited line size; and

expansion control means connected to said editing control means and said character pattern memory, said expansion control means being operative, after expanding character patterns of character codes in said first combinational information into said line buffer memory using character patterns in said character pattern memory in response to said first combinational information and after expanding divided portions of character patterns of divisional char-

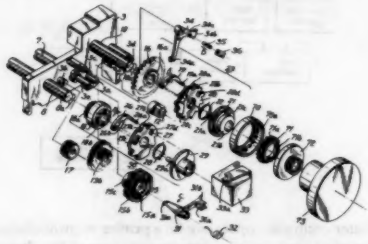
acter codes in said second combinational information into said line buffer memory using character patterns in said character pattern memory in response to said second combinational information, to write the expanded character patterns into said page memory.

4,707,154

PRINTER

Kenichiro Arai, Shiojiri, Japan, assignor to Seiko Epson Kabushiki Kaisha, Japan

Continuation of Ser. No. 686,351, Dec. 26, 1984, abandoned. This application Dec. 19, 1986, Ser. No. 943,889
Claims priority, application Japan, Dec. 27, 1983, 58-251589
Int. Cl.[4] B41J *23/34, 3/20*
U.S. Cl. 400—185 **11 Claims**



1. A clutch controller for a power transmission, comprising:

a clutch rotatably mounted to the power transmission with a perimeter of the clutch divided into N equal rotating angles where N is a positive integer, each of said N equal rotating angles being further divided into two unequal rotating angles including a large rotating angle and a small rotating angle, the sum of the large rotating angle and the small rotating angle equalling one of said equal rotating angles, the perimeter of the clutch thereby being divided into 2N unequal rotating angles;

each of said large and small rotating angles defining a stopped position of said clutch;

controlling means, selectively coupled to the clutch for controlling the rotation of the clutch by selective engagement and disengagement of the controlling means and the perimeter of the clutch at the 2N unequal rotating angles;

electromagnetic control means, coupled to the controlling means, for decoupling the controlling means from the clutch, thereby allowing the clutch to rotate through an integral number of the unequal rotating angles, during an energization period and recoupling the controlling means with the clutch after the energization period, thereby preventing further rotation of the clutch; and

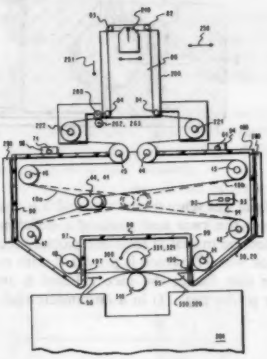
output means, coupled to the clutch, having a first position and a second position; the electromagnetic control means establishing the output means in the second position when the electromagnetic control means is energized for a first period longer than the time for the clutch to rotate through the small rotating angle and shorter than the time for the clutch to rotate through the large rotating angle and the clutch is rotated from one unequal rotating angle to an adjacent unequal rotating angle when the electromagnetic control means is energized for a second period shorter than the time for the clutch to rotate through the small rotating angle.

4,707,155

RE-INKABLE RIBBON TRANSPORT SYSTEM

Herbert A. Burkhead, and Ronald E. Hunt, both of Georgetown, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 24, 1985, Ser. No. 813,163
Int. Cl.[4] B41J *27/12*
U.S. Cl. 400—199 **10 Claims**



1. A ribbon transport apparatus for use in a printer having a printhead attached to a translatable printhead carrier comprising:

a continuous translatable re-coatable ribbon;

means for containing said continuous translatable re-coatable ribbon, wherein said means for containing is detached from said translatable printhead carrier, and stationary with respect to a printer frame;

a gear rack coupling between said printhead carrier and said printer frame for effectuating a constant length ribbon path between said printhead carrier and said containing means;

a re-coating station positionally detached from said translatable printhead carrier, and in contactable relation with said continuous translatable re-coatable ribbon;

a first supply queue of re-inked ribbon from the re-coating station;

a second supply queue of used ribbon from the printhead carrier; and

buffering means coupled to said first and second supply queue for movement effectuating a decrease in a first ribbon path length of one of said supply queues and a corresponding increase in a second ribbon path length of the other of said supply queues;

wherein a displacement of the continuous translatable re-coatable ribbon passing the re-coating station varies from a displacement of the continuous translatable re-coatable ribbon passing the printhead.

4,707,156

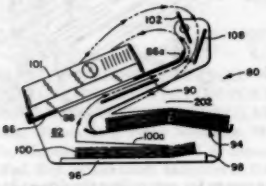
PRINTER STAND AND PAPER REFOLDING APPARATUS

James B. Clark, Oakdale, Calif., assignor to MicroComputer Accessories Inc., Los Angeles, Calif.

Continuation-in-part of Ser. No. 613,521, May 24, 1984, abandoned. This application Sep. 30, 1985, Ser. No. 782,280
Int. Cl.[4] B41J *11/58*
U.S. Cl. 400—613.2 **7 Claims**

1. A combination printer stand and paper refolding apparatus for use with an associated printer, and associated sheets of fanfold paper, which comprises: a printer receiving shelf dimensioned and configured for holding a printer, said printer receiving shelf being disposed during normal operation in

oblique relation to a horizontal plane; a first paper receiving shelf dimensioned and configured for receiving paper on which printing has been completed, said first paper receiving shelf being disposed substantially beneath said printer receiving shelf and being substantially horizontal during normal operation, said first paper receiving shelf having a peak intermediate the boundaries thereof, said peak being elongated and extending perpendicular to the direction of paper movement; and a second paper receiving shelf dimensioned and configured for receiving paper on which printing is to be accomplished, said second paper receiving shelf being disposed substantially beneath said first paper receiving shelf, said second paper receiving shelf having a minor portion thereof extending to the rear of said printer receiving shelf, said second paper receiving shelf being substantially horizontal during normal



operation and including means for tipping a stack of the associated fan fold paper in the direction in which sheets of the associated fanfold paper are removed from said second paper receiving shelf; and

means for directing the path of the associated fanfold paper leaving the associated printer to said second paper receiving shelf and to cause refolding of the associated fanfold paper on said second paper receiving shelf, said means for directing the associated fanfold paper including a pivotally mounted member which is elongated in a direction which is transverse to the direction of movement of the fanfold paper, said means for directing the associated sheets of fanfold paper directing the fanfold paper from the front of said first paper receiving shelf and to the back of said second paper receiving shelf after printing has been accomplished.

4,707,157

MATRIX PRINTER WITH ELECTROSTATIC DISCHARGE

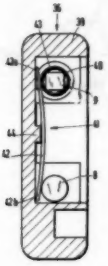
Wolfgang Hauslaib, Langenau, Fed. Rep. of Germany, assignor to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany

Filed Aug. 15, 1985, Ser. No. 766,046

Claims priority, application Fed. Rep. of Germany, Aug. 16, 1984, 3430091

Int. Cl.[4] B41J *11/26, 29/02*

U.S. Cl. 400—616 **5 Claims**



1. In a matrix printer having a chassis and facilities for the advance of edge perforated print material and including particularly traction devices engaging the perforations for advancing the print medium through the printer, a structure for preventing the development of electrostatic charges comprising in combination:

a pair of lateral carrier arms being connected to the chassis:

a drive shaft journalled for rotation in said carrier arms and being mounted therein to be electrically insulated from the carrier arms, there being means interposed between the arms and the drive shaft for providing electrical insulation as between the drive shaft and the carrier arms, the drive shaft itself being electrically conductive and also electrically connected with the traction means;

a metallic connecting rod interconnecting said carrier arms in electrically conductive relation so that the carrier arms, the drive shaft, and the connecting rod constitute an electrically conductive frame for holding the transport device; and

means including a support which rides on said connecting rod and said drive shaft. for providing electrical connection between said drive shaft and said connecting rod to thereby discharge electrical charges into the chassis.

4,707,158

TRACTOR FEED FOR MARGIN PERFORATED PAPER WEBS

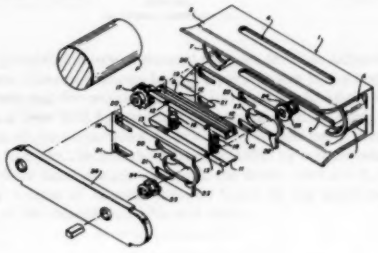
Norbert Hofmann, Nuremberg, Fed. Rep. of Germany, assignor to Ta Triumph-Adler A.G., Nuremberg, Fed. Rep. of Germany

Filed Jan. 30, 1987, Ser. No. 8,861

Claims priority, application Fed. Rep. of Germany, Feb. 7, 1986, 3603815

Int. Cl.[4] B41J *11/34*

U.S. Cl. 400—616.2 **4 Claims**



1. A tractor feed for use in printers having paper webs with margin perforations having a housing defining upper and lower said tractor feed paper guide slots, an endless band supporting feed pins for entry into said guide slots and for engagement with said perforations of a paper web introduced into said guide slots to cause the paper to be transported toward, around and away from a platen, and upper and lower band guide rails, the improvement comprising:

spring means urging said upper and lower guide rails apart and toward said band,

laterally disposed pins carried by each of said guide rails and mounting said guide rails for selective movement toward and away from one another, a sliding block having cam slots into which said laterally disposed pins extend, said cam slots being shaped to selectively cause entry of said feed pins into either only said upper, paper guide slot or both of said paper guide slots, and means for moving said sliding block, whereby movement of said sliding block causes movement of said guide rails.

4,707,159

SERIAL PRINTER INCLUDING A LATERALLY RECIPROCABLE RECORDING HEAD, PAPER BAIL CONTROL, PAPER DETECTION AND FEEDING MEANS, A MULTICOLOR INK RIBBON INCLUDING A HEAD CLEANING ZONE, A RIBBON CASSETTE AND RIBBON SHIFT MEANS

Hirofumi Hirano; Masaaki Nakamura; Hitoshi Hasumi; Shoichi Inoue, and Akiteru Furukawa, all of Chichibu, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 23, 1985, Ser. No. 758,129

Claims priority, application Japan, Jul. 26, 1984, 59-154140; Jul. 26, 1984, 59-154142; Oct. 1, 1984, 59-204037; Oct. 1, 1984, 59-204038; Oct. 1, 1984, 59-204039; Oct. 1, 1984, 59-204040

Int. Cl.[4] B41J *13/20*

U.S. Cl. 400—639.1 **14 Claims**

1. A printer comprising:

a recording head for performing recording on a recording medium;

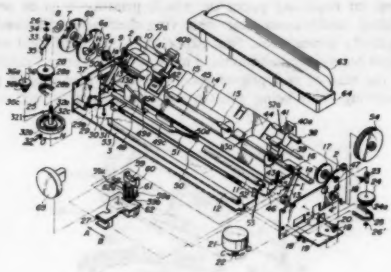
a carriage carrying said recording head for reciprocating said recording head in a predetermined direction within a predetermined range;

a platen extending in said predetermined direction, said platen successively feeding said recording medium to a recording area opposite said recording head;

holding means for pressing said recording medium against said platen in the vicinity of said recording area;

supporting means for supporting said holding means so that said holding means can be pressed against and detached from said platen;

a mechanism co-operatively coupled to said carriage and a portion of said supporting means for transferring the moving frame of said carriage to said supporting means thereby pressing and detaching said holding means against and from said platen, said mechanism releasing said holding means from a condition wherein said holding means is pressed against said platen when said carriage is within a predetermined range portion at an end of said predetermined range; and



controlling means for controlling the drive of said platen and said carriage, said controlling means having a first mode for driving said platen by a first amount of movement when said carriage is within said predetermined range and a second mode for driving said platen by a second amount smaller than said first amount when said carriage is outside of said predetermined range.

4,707,160

PARTICLES CONTAINING ACTIVE HALOGEN BLEACH IN A DILUTED CORE

Kil Whan Chun, Wyckoff; Allan H. Gilbert, Oradell, both of N.J.; David J. Lang, Ossining, N.Y., and Edward Santos, Guttenberg, N.J., assignors to Lever Brothers Company, New York, N.Y.

Filed Dec. 31, 1985, Ser. No. 815,412
Int. Cl.[4] D06L *3/00, 3/06;* C11D *9/42;* A62D *3/00*
U.S. Cl. 8—101 15 Claims

1. Hard spherical bleaching particles whose composition is an intimately dispersed agglomerated mixture comprising:

(i) from about 1 to about 805 by weight of an alkali metal dichloroisocyanurate;

(ii) from about 1 to about 80% of an alkali metal salt of tripolyphosphate; and

(iii) from about 0.5 to about 60% of a binder with melting point 85° to 120° F.

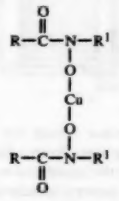
4,707,161

LIGHTFASTNESS OF DYEINGS OBTAINED WITH ACID DYES OR METAL COMPLEX DYES ON POLYAMIDES: TREATMENT WITH COPPER HYDROXAMATES

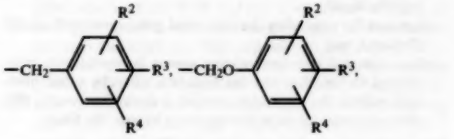
Michael Thomas, Weisenheim; Peter Neumann, Wiesloch; Dieter Wegerle, Mannheim, and Reinhold Krallmann, Weisenheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

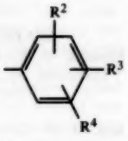
Continuation of Ser. No. 633,457, Jul. 23, 1984, Pat. No. 4,613,334. This application Jul. 21, 1986, Ser. No. 887,707
The portion of the term of this patent subsequent to Sep. 23, 2003, has been disclaimed.
Int. Cl.[4] D06P *1/64, 3/24, 5/10*
U.S. Cl. 8—442 8 Claims

1. A process for improving the lightfastness of dyeings obtained with acid dyes or metal complex dyes or a mixture thereof on polyamide textile materials by treating the materials, before, during or after dyeing, with a copper complex of a copper hydroxamate having the formula:

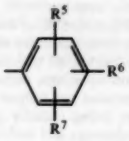


wherein R is C_{17}–C_{17}-alkyl, or C_3–C_8-cycloalkyl, which is unsubstituted or substituted by one or two alkyl groups of 1 to 4 carbon atoms, a radical selected from the group consisting of:





or a substituted or unsubstituted furanyl, thiophenyl or pyridinyl; R_2, R_3 and R_4 are hydrogen, C_1–C_{17}-alkyl, methoxy or ethoxy, or one or two of the radicals R^2, R^3 and R^4 are chlorine or bromine; and R^1 is C_1–C_{12}-alkyl, C_3–C_8-cycloalkyl or



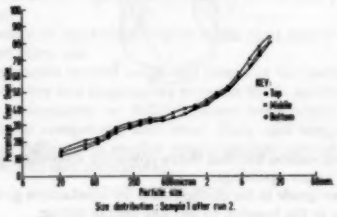
wherein R^5, R^6 and R^7 are hydrogen, C_1–C_4-alkyl or a methoxy group.

4,707,162

MINERAL SLURRIES

David A. Brookes, Orpington, England, assignor to The British Petroleum Company p.l.c., London, England

Filed Aug. 10, 1984, Ser. No. 639,389
Claims priority, application United Kingdom, Aug. 19, 1983, 8322432
The portion of the term of this patent subsequent to Jun. 25, 2002, has been disclaimed.
Int. Cl.[4] C10L *1/32*
U.S. Cl. 44—51 8 Claims



1. A pumpable slurry of mineral particles in water comprising coarse mineral particles having a particle size in the range 5 to 50 mm and fine mineral particles having a size less than 200 micron, at least 30% by weight of the mineral particles being in the form of coarse particles, 10 to 40% by weight being in the form of fine particles and the balance to 100% by weight being intermediate sized particles, wherein the slurry contains 82 to 85% by weight of mineral particles based on the combined weight of the mineral particles and water.

4,707,163

GASIFICATION OF COAL DUST

Ernest Gudymov; Vasilij Fedotov; Vladimir Semenov; Boris Rodinov, all of Moscow, U.S.S.R.; Friedrich Berger, Brand-Erbisdorf; Winfried Wenzel, Freiberg, German Democratic Rep.; Helmut Peise, Frieberg, German Democratic Rep., and Manfred Schingnitz, Freiberg, German Democratic Rep., assignors to Brennstoffinstitut Freiberg, Freiberg, German Democratic Rep. and Godsudarstvenny Nauchno Tssledovatelsky I Protektny Institut, Moscow, U.S.S.R.

Filed Oct. 29, 1985, Ser. No. 792,476
Int. Cl.[4] C10J *3/48*
U.S. Cl. 48—73 8 Claims

1. An apparatus for gasifying coal dust, the apparatus comprising:

a vertical cylindrical housing provided with an output fitting for the removal of generator gas and an output fitting for the removal of granulated slag, the housing having an upper reaction zone and immediately therebelow a lower cooling zone;

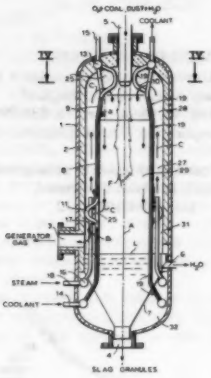
a high-temperature thermal protection lining in the housing;

means including an overflow for maintaining a body of liquid in the bottom of the housing;

means including a coal-dust burner in the housing for forming a downwardly moving coal-dust flame in the upper reaction zone of the housing;

an annular tube wall positioned in the housing and having intake and output manifolds and upper and lower ends where its tubes are bent apart to form radially throughgoing upper and lower openings, respectively at the burner and above the generator gas output fitting,

the tube wall further being radially gastight between said upper and lower openings and defining with said housing an axially extending annular passage that is outwardly limited by the housing and which is mainly of uniform



cross section but that flares upwardly immediately below the upper opeinings;

a funnel guide in the cooling zone for conduction granulated slag in the housing to the slag-output fitting;

a steam manifold positioned in the housing and provided with a plurality of lances opening upwardly in the annular passage above the lower openings;

means for feeding steam to the steam manifold and thereby creating in the housing a toroidal annular current of moving gas and steam rising in the passage and descending in the zones between the flame and the tube wall; and

means for circulating a coolant between the tube-wall manifolds and thereby cooling the current of gas to below the softening temperature of any slag in the flame.

4,707,164

VAPOR RECOVERY SYSTEM

Robert S. Harris, Connersville, Ind., assignor to Stant Inc., Connersville, Ind.

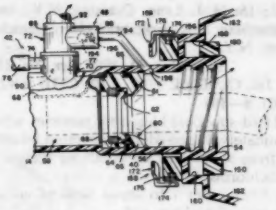
Filed Mar. 31, 1986, Ser. No. 846,081
Int. Cl.[4] B01D *19/00*
U.S. Cl. 55—168 **34 Claims**

1. A system for recovering fuel vapors discharged from a vehicle fuel system during refueling, the vehicle fuel system including a fuel tank having a vent tube and a separate filler neck, the system comprising

partition means for dividing the filler neck into an outer chamber communicable with the atmosphere and an inner chamber in fluid communication with the fuel tank, the partition means including aperture means for sealingly admitting a fuel dispensing nozzle into the inner chamber without coupling the inner and outer chambers in fluid communication during refueling,

separator means for separating liquid fuel entrained in the fuel vapor from fuel vapor discharged from the fuel tank via at least one of the vent tube and filler neck, and

vapor recovery means for selectively processing vapor discharged from the separator means at a fuel vapor treatment site without discharging vapor through the outer



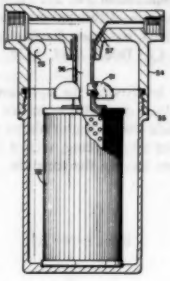
chamber of the filler neck to the atmosphere during refueling.

4,707,165

GAS AND FLUID SEPARATOR

Thomas E. Tauber, Lansdowne, and James L. Horan, Morton, both of Pa., assignors to Aeroquip Corporation, Jackson, Mich.

Filed Mar. 4, 1985, Ser. No. 708,003
Int. Cl.[4] B01D *19/00*
U.S. Cl. 55—204 **8 Claims**



1. In a fluid lubrication system for mechanical drives, a separator for separating a gas from a liquid which comprises:

(a) means for causing the liquid and entrapped gas to engage in a cyclonic flow pattern, which includes a housing having a first end and a second end, and wherein a filter is operatively connected to the first end whereby the leaving liquid passes through the filter which stops solid particles, and wherein said liquid tangentially enters said housing at said first end;

(b) means operatively connected to said first end for removing the liquid;

(c) means for removing the separated gas, connected to said first end; and

(d) an internal pressure release means is operatively connected to the filter and the first end whereby when pressure within the separator exceeds a desired pressure, this release means permits the liquid to bypass the filter.

4,707,166

AIR DRYER FOR AIR BRAKE SYSTEM

Mostafa M. Khosropour, Madison, Wis., assignor to Nelson Industries, Inc., Stoughton, Wis.

Filed Aug. 29, 1986, Ser. No. 902,196
Int. Cl.[4] B01D *39/10*
U.S. Cl. 55—213 **12 Claims**

1. A compact air dryer construction for an air brake system, comprising:

a housing unit having distally opposite ends and having a first housing portion extending between said ends, said first housing portion comprising one or more members having internal passage means and external heat radiating fins to provide a heat exchanger for cooling air in said first housing portion to condense water therefrom, and having a second hollow cylindrical housing portion extending axially longitudinally between said ends;

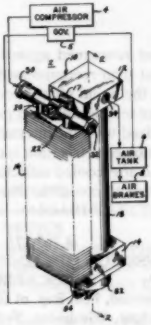
an air inlet to said first housing portion;

an air oulet from said second housing portion;

a communication passage communicating between said first and second housing portions and providing an outlet from said first housing portion and an inlet to said second housing portion;

a water repellant filter in said second housing portion and having a first side communicating with said communication passage and having a second side communicating with said outlet from said second housing portion, said filter passing air therethrough and blocking the passage of water therethrough,

wherein said inlet to said second housing portion is at one of said distal ends of said housing unit, said outlet from said second housing portion is at the other of said distal ends of said housing unit, said filter is a hollow tubular member spaced radially inwardly of said hollow cylindrical second housing portion to define an annular gap therebetween



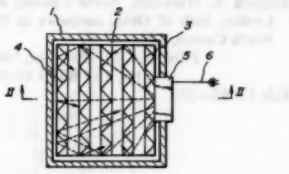
communicating with one of said inlet and outlet for said second housing portion, the hollow interior of said tubular filter element communicating with the other of said inlet and outlet for said second housing portion, such that air flows axially in said annular gap and in said hollow interior of said tubular filter and flows radially through said filter between said inlet and outlet of said second housing portion,

wherein said one distal end of said housing unit comprises a plate axially spaced from one end of said filter to define an axial gap therebetween, said annular gap communicates through said axial gap with said inlet to said second housing portion, and comprising biasing means in said axial gap bearing between said plate and said one end of said filter to bias the latter toward said other distal end of said housing unit, said outlet from said second housing portion has a passage communicating with the hollow interior of said tubular filter, the other axial end of said filter has an annular end face encircling said last mentioned passage and biased into sealing engagement with said other distal end of said housing unit by said biasing means, and wherein said axial gap defines a collection chamber in said second housing portion a said one distal end of said housing unit for collecting water condensed from said first housing portion and repelled by said filter in said second housing portion.

4,707,167
AIR STERILIZATION FILTER

Kenichiro Saito, Tokyo; Chikao Kanaoka, Kanazawa, and Shigeyuki Aoyama, Tokyo, all of Japan, assignors to Aoki Corporation, Osaka, Japan

Filed Aug. 28, 1986, Ser. No. 901,376
Claims priority, application Japan, Sep. 10, 1985, 60-198626
Int. Cl.[4] B01D *35/06*
U.S. Cl. 55—267 **15 Claims**



1. An air sterilization filter for installation in a passageway between an enclosure wherein biological work is carried out and a space external thereto, comprising

a filter box having interior walls surrounding said passageway;

a sheet filter having a flexously pleated configuration defining a plurality of pleat spaces, said sheet filter being fixed to said interior walls and extending across said passageway;

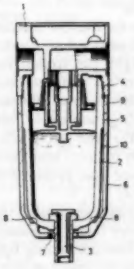
a plurality of separators located in the pleat spaces of said sheet filter; and

heating means located inside said filter box for heating said sheet filter to a temperature between 80° C. and the thermal deformation or transformation temperature of the material comprising said sheet filter, said temperature being sufficient to sterilize micoorganisms carried by the air within said passageway.

4,707,168
CASE GUARD DEVICE FOR AIR FILTER AND LUBRICATOR OF COMPRESSED AIR SYSTEM

Masashi Mizutani, Takarazuka, Japan, assignor to Konan Electric Co., Ltd., Nishinomiya, Japan

Filed May 23, 1986, Ser. No. 867,344
Claims priority, application Japan, Aug. 21, 1985, 60-126496; Aug. 30, 1985, 60-131579
Int. Cl.[4] B01D *46/00*
U.S. Cl. 55—274 **11 Claims**



1. A case guard device for an air filter and a lubricator of a compressed air system, comprising a main body adapted to be connected to piping and a transparent case attached to the main body, said case guard device comprising:

a transparent case guard of synthetic resinous material, said case guard having a bottom with an opening therein and

being shaped to enclose the whole of the case except at the bottom of the case, the case guard and the case being so configured as to form a gap between the case guard and the case; and

a connecting means for connecting said case guard to said main body.

4,707,169

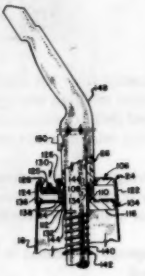
CORD DUMP AND BAG TENSIONING CAP

Richard A. Wareham, North Canton, and Dean H. Buchtel, Canton, both of Ohio, assignors to The Hoover Company, North Canton, Ohio

Filed Oct. 10, 1986, Ser. No. 917,901

Int. Cl.[4] B01D *46/02*

U.S. Cl. 55—357 **8 Claims**



1. A cleaner having a bag and including:

(a) a means for tautening said bag, resiliently urged for stretching said bag, and

(b) a cord hook mounted with said bag tautening means,

(c) whereby movement of said bag tautening means against said resilient urging provides a cord dump function for said cleaner.

4,707,170

STAGED MULTICOMPONENT REFRIGERANT CYCLE FOR A PROCESS FOR RECOVERY OF C_{3+} HYDROCARBONS

Calvin L. Ayres, Allentown, and Howard C. Rowles, Center Valley, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Jul. 23, 1986, Ser. No. 889,061

Int. Cl.[4] F25J *3/02*

U.S. Cl. 62—24 **15 Claims**

1. A process for the low temperature separation of a feed gas into a heavy hydrocarbon product containing C_{3+} hydrocarbons and a light gas stream containing H_2, N_2, CO, CO_2, methane and/or C_2 hydrocarbons or other light gases using a two temperature and two pressure stage, closed-circuit, multicomponent refrigerant cycle comprising the steps of:

(a) cooling the feed gas to effect the partial condensation of said gas by indirect heat exchange against a relatively high temperature and pressure stage of said multicomponent refrigerant;

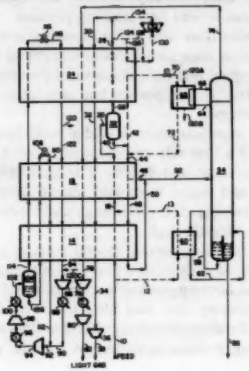
(b) initially phase separating the partially condensed feed gas into a heavy liquid containing heavy hydrocarbons and a vapor stream containing light feed gas components;

(c) rectifying the vapor stream by low temperature dephlegmation to produce a light gas stream and additional heavy liquid wherein the rectification is obtained at least in part by indirect heat exchange against a relatively low temperature and pressure stage of said multicomponent refrigerant;

(d) removing said heavy liquid as a heavy hydrocarbon product containing C_{3+} hydrocarbons;

(e) removing the light gas stream of step (c) as a product light gas stream containing H_2, N_2, CO, CO_2, methane and/or C_2 hydrocarbons or other light gases; and

(f) providing the predominant amount of the refrigeration for the process from said closed-circuit, multicomponent, refrigerant cycle wherein the refrigerant is partially condensed phase separated, the vapor phase is cooled, condensed and expanded to a relatively low temperature and



pressure and rewarmed against the vapor stream being rectified and then recompressed to an intermediate pressure, while the liquid phase is cooled, expanded to a relatively higher temperature and pressure, rewarmed against feed gas, mixed with the intermediate pressure refrigerant and the combined refrigerant is compressed to an elevated pressure and aftercooled sufficiently to partially condense the refrigerant to complete the circuit.

4,707,171

PROCESS FOR OBTAINING C_{2+} OR C_{3+} HYDROCARBONS

Heinz Bauer, Neuried, Fed. Rep. of Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Filed Dec. 17, 1985, Ser. No. 809,958

Claims priority, application Fed. Rep. of Germany, Dec. 17, 1984, 3445962; Mar. 29, 1985, 3511636

The portion of the term of this patent subsequent to Nov. 10, 2004, has been disclaimed.

Int. Cl.[4] F25J *3/02*

U.S. Cl. 62—30 **23 Claims**

1. In a process for the separation of higher boiling hydrocarbons from a feed gas stream containing light hydrocarbons, said process comprising the steps of:

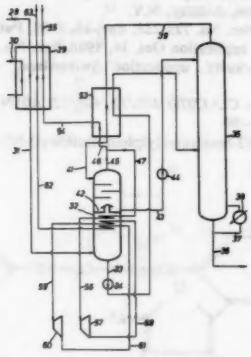
(a) the feed gas stream, under superatmospheric pressure, is cooled, partially condensed and separated into a liquid fraction and a gaseous fraction; and

(b) said liquid fraction is delivered to a rectification column and subjected to rectification to obtain a product stream containing an enriched proportion of higher boiling hydrocarbons and a residual gas stream containing predominantly lower boiling components, wherein the improvement comprises,

(c) delivering said gaseous fraction to a recontacting column to scrub out higher boiling hydrocarbons from the gaseous fraction, said recontacting column having a bottom portion and a top portion, said gaseous fraction being delivered to said recontacting column without substantial reduction of pressure;

(d) partially condensing said residual gas to form a resultant partial condensate and delivering said residual gas stream to said recontacting column wherein said resultant partial

condensate is employed as a scrubbing agent for the scrubbing step; and



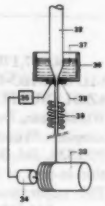
(e) passing resultant liquid fraction from the bottom portion of the recontacting column to the rectification column.

4,707,172

METHOD OF MAKING VARIABLE SECTION FIBER OPTICS

Stefano Sottini, Vaglia; Massimo Brenci, Pistoia; Riccardo Falciai, Campi Bixenzio, and Vera Russo, Florence, all of Italy, assignors to Consiglio Nazionale Delle Ricerche, Rome, Italy

Division of Ser. No. 361,416, Mar. 24, 1982, Pat. No. 4,521,070. This application Feb. 22, 1985, Ser. No. 704,518
Claims priority, application Italy, Mar. 24, 1981, 9367 A/81
Int. Cl.[4] C03C *25/02*
U.S. Cl. 65—3.11 4 Claims



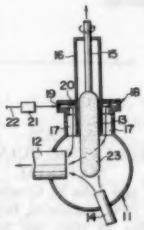
1. A process for manufacturing an at least partially tapered optical fibre for a laser radiation transmission device, the fibre comprising a core, with cladding and an external coating, the process comprising the steps of: heating fibre material, pulling a fibre from the material with a speed controlled by an electronic circuit according to a cosine curve tapering profile with a length of at least 50–100 times as large as the greatest diameter of the core to obtain diameter variations of the fibre, and as soon as said fibre is pulled, coating said fibre with a layer of plastic material.

4,707,173

METHOD OF FABRICATING POROUS GLASS ROD AND APPARATUS FOR FABRICATING THE SAME

Hideyo Kawazoe; Akira Iino, and Katsumi Orimo, all of Ichihara, Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed May 15, 1986, Ser. No. 863,562
Int. Cl.[4] C03B *37/026*
U.S. Cl. 65—3.12 12 Claims



1. A method of fabricating a porous glass rod in a reaction vessel including a first passage at the top of the vessel, an exhaust port in one wall of the vessel and a burner mounted at the lower end in the vessel for forming fine glass particles, comprising the steps of:

introducing a target into said passage and rotating the target;

accumulating fine glass particles produced by the burner to form a porous glass rod at the lower end of the target rotated at a predetermined position in the reactor;

drawing the target out of the reaction vessel through said passage in response to growth of the porous glass rod; and

introducing a gas stream into the reaction vessel through a second passage separate from and outwardly concentric with respect to said first passage and having a constant flow resistance.

4,707,174

FABRICATION OF HIGH-SILICA GLASS ARTICLE

David W. Johnson, Jr., Pluckemin; John B. MacChesney, Lebanon; Eliezer M. Rabinovich, and Eva M. Vogel, both of Berkeley Heights, all of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 743,268, Jun. 10, 1985, abandoned, Continuation-in-part of Ser. No. 564,181, Dec. 22, 1983, abandoned. This application Nov. 20, 1986, Ser. No. 931,951
Int. Cl.[4] C03B *19/09*
U.S. Cl. 65—18.1 13 Claims

1. Method of producing an optical fiber comprising a core and a cladding surrounding the core, the core and the cladding consisting of high-silica glass, the method comprising making a high-silica glass body having a predetermined refractive index profile, with a center region of relatively high refractive index and a peripheral region of relatively low refractive index surrounding the center region, the glass body to be referred to as the preform, heating at least a part of the preform to a temperature above a sintering temperature, and drawing the optical fiber from the heated part of the preform, with the fiber core and cladding derived from the center region and peripheral region of the preform, respectively; wherein the preform is made by a process that comprises

(a) making a porous high-silica body by a sol-gel process, the porous body having an inner portion and an outer portion;

(b) drying the porous body including heat treatment in an atmosphere comprising chlorine to remove bound water; and

(c) sintering the porous body at the sintering temperature such that the porous body is transformed into the preform, the center and peripheral regions of the preform derived,

respectively, from the inner and outer portion of the porous body;

the method further comprises

(d) causing to be present, prior to completion of step (c), in both the inner and the outer portion of the porous body, a fluorine concentration that is effective to essentially prevent the evolution of bubbles in the heated part of the preform during the heating and fiber drawing, such that the core and the cladding of the optical fiber are essentially free of bubbles.

4,707,175

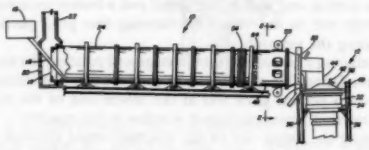
METHOD OF PREHEATING PULVERULENT BATCH MATERIAL

Robert B. Heithoff, and John K. Groetzinger, both of LaVale, Md., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 23, 1985, Ser. No. 812,039

Int. Cl.[4] C03B *3/00*

U.S. Cl. 65—27 **13 Claims**



1. A method of preheating pulverulent material as it advances into a heating zone, comprising:

passing said materials through a preheating zone and into said heating zone;

moving exhaust gas from said heating zone into and through said preheating zone to expose said material in said preheating zone to said exhaust gas to preheat said material; and

extracting heat from said batch material in proximity to a discharge end of said preheating zone to prevent said material from reaching a temperature at which said material will agglomerate prior to said material passing into said heating zone.

4,707,176

PLANT GROWTH MEDIA CONTAINING RICE HULL ASH

Robert L. Durham, Simonton, Tex., assignor to Agritec, Inc., Houston, Tex.

Continuation-in-part of Ser. No. 270,749, Jun. 4, 1981, abandoned, and a continuation of Ser. No. 497,293, May 23, 1983, abandoned. This application Apr. 15, 1985, Ser. No. 723,232

Int. Cl.[4] C05F *11/00*; C05G *3/04*

U.S. Cl. 71—23 **17 Claims**

1. A soil containing,

rice hull ash in a substantially amorphous state and having a substantially porous skeletal structure, the rice hull ash effective to improve plant growth characteristics of the soil, and

the rice hull ash effective to store liquid and air in its pores and to release them to a plant in the soil.

4,707,177

SULFONYLUREAS

Rolf Schurter, Binningen, Switzerland, and Georg Pissiotas, Lörrach, Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

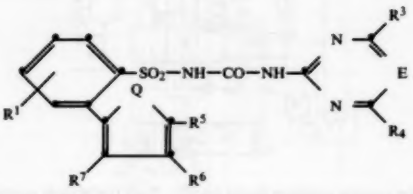
Division of Ser. No. 723,233, Apr. 15, 1985, Pat. No. 4,637,829. This application Oct. 16, 1986, Ser. No. 919,535

Claims priority, application Switzerland, Apr. 27, 1984, 2062/84-0

Int. Cl.[4] C07D *405/12, 409/12*; A01N *43/66*

U.S. Cl. 71—90 **7 Claims**

1. An N-(2-heterocyclylphenylsulfonyl)-N'-triazinylurea of the formula



wherein

E is nitrogen,

Q is oxygen or sulfur,

R^1 is hydrogen or chlorine,

R^3 and R^4 are each independently of the other methyl or methoxy

R^5 is C_1–C_6 alkyl substituted by cyano, $-COR^{10}$, $-C(R^{10})=NR^{11}$, $-CH=CH-COOR^{12}$ or

R^6 and R^7 are hydrogen,

R^{10} is hydrogen, or unsubstituted C_1–C_{10}alkyl or C_2–C_4alkenyl,

R^{11} is unsubstituted C_1–C_6alkyl,

R^{12} is methyl and,

Y is C_2–C_3alkylene.

4. A herbicidal and plant growth regulating composition which comprises as active ingredient a substituted N-phenylsulfonyl-N'-triazinylurea of claim 1 together with a carrier and/or other adjuvants.

4,707,178

HERBICIDAL ORTHO-HETEROCYCLIC PYRAZOLESULFONAMIDES

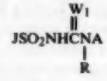
Mark E. Thompson, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 756,538, Jul. 22, 1985, Pat. No. 4,655,817, which is a continuation-in-part of Ser. No. 671,072, Nov. 13, 1984, abandoned. This application Dec. 22, 1986, Ser. No. 944,815

Int. Cl.[4] C07D *401/12, 401.14, 417/12*; A01N *43/66*

U.S. Cl. 71—90 **42 Claims**

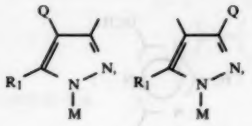
1. A compound of the formula:



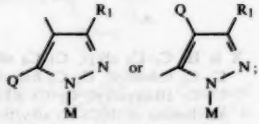
I

wherein

J is

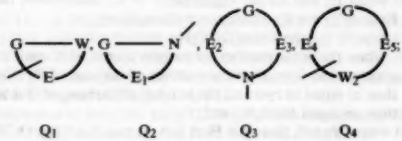


J-1 J-2



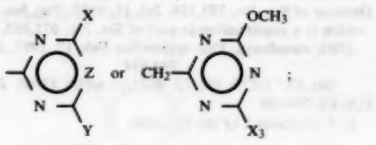
J-3 J-4

W_1 is O or S;
R is H or CH_3;
R_1 is H, C_1–C_3 alkyl, C_1–C_3 haloalkyl, halogen, nitro, C_1–C_3 alkoxy, $SO_2NR^IR^{II}$, C_1–C_3 alkylthio, C_1–C_3 alkylsulfinyl, amino, C_1–C_3 alkylsulfonyl, CO_2R^{III}, C_1–C_3 haloalkoxy, C_1–C_3 haloalkylthio, CH_2CN, CH_2OCH_3 or CH_2SCH_3;
R^I is H, C_1–C_4 alkyl, C_2–C_3 cyanoalkyl, methoxy or ethoxy;
R^{II} is H, C_1–C_4 alkyl or C_3–C_4 alkenyl; or
R^I and R^{II} may be taken together as $-(CH_2)_3-$, $-(CH_2)_4-$, $-(CH_2)_5-$ or $-CH_2CH_2OCH_2CH_2-$;
R^{III} is C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, C_2–C_4 haloalkyl, C_2–C_3 cyanoalkyl, C_5–C_6 cycloalkyl, C_4–C_7 cycloalkylalkyl or C_2–C_4 alkoxyalkyl;
M is H, C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, phenyl, phenyl substituted with Cl, NO_2, CH_3 or OCH_3, C_2–C_3 alkoxycarbonyl, C_1–C_3 alkylsulfonyl or $SO_2NR_4R_5$;
Q is



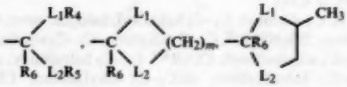
Q_1 Q_2 Q_3 Q_4

G is C=O or SO_2;
W is O, S, CHR_2 or NR_3;
W_2 is O, SO_2, CHR_2 or NR_3;
R_2 is H, C_1–C_2 alkyl, Cl, F or Br;
R_3 is H, C_1–C_4 alkyl, C_1–C_4 haloalkyl, C_2–C_4 alkoxyalkyl, C_2–C_4 cyanoalkyl, C_3–C_4 alkenyl or C_3–C_4 alkynyl;
E and E_1 are independently C_3–C_4 alkylene, C_3–C_4 alkenylene or C_4 alkenyldienyl;
E_2 and E_4 are independently C_1–C_2 alkylene or C_2 alkenylene;
E_3 and E_5 independently are C_2–C_3 alkylene or C_2–C_3 alkenylene; and
E, E_1, E_2, E_3, E_4 and E_5 may optionally be substituted by 1-4 groups selected from C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 alkenyl, OH, halogen or C_1–C_4 haloalkoxy; further, when W is O, CHR_2 or NR_3, one of the carbon atoms of E may be in the form of a carbonyl group, and when W_2 is O, CHR_2 or NR_3, one of the carbon atoms of E_4 or E_5 may be in the form of a carbonyl group, provided that said carbonyl groups are not bonded directly to G;
A is



A-1 A-6

X is H, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 haloalkoxy, C_1–C_4 haloalkyl, C_1–C_4 haloalkylthio, C_1–C_4 alkylthio, C_2–C_5 alkoxyalkyl, C_2–C_5 alkoxyalkoxy, amino, C_1–C_3 alkylamino or di(C_1–C_3 alkyl)amino;
Y is H, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 haloalkoxy, C_1–C_4 haloalkylthio, C_1–C_4 alkylthio, halogen, C_2–C_5 alkoxyalkyl, C_2–C_5 alkoxyalkoxy, amino, C_1–C_3 alkylamino, di(C_1–C_3 alkyl)amino, C_3–C_4 alkenyloxy, C_3–C_4 alkynyloxy, C_2–C_5 alkylthioalkyl, C_2–C_5 alkylsulfinylalkyl, C_2–C_5 alkylsulfonylalkyl, C_1–C_4 haloalkyl, C_3–C_5 cycloalkyl, C_2–C_4 alkynyl, C(O)R_6,



or $N(OCH_3)CH_3$;
m is 2 or 3;
L_1 and L_2 are independently O or S;
R_4 and R_5 are independently C_1–C_2 alkyl;
R_6 is H or CH_3;
Z is N; and
X_3 is CH_3 or OCH_3;
and their agriculturally suitable salts; provided that
(a) when G is SO_2, then W is O, CHR_2 or NR_3;
(b) when E_2 or E_4 is C_2 alkylene or C_2 alkylene then E_3 or E_5 is C_2 alkylene or C_2 alkenylene;
(c) when M is other than H, alkyl, alkenyl, alkynyl or phenyl, optionally substituted, then R_1 is H, alkyl, haloalkyl or halogen;
(d) X and Y are other than OCF_2H;
(e) when the total number of carbon atoms of X and Y is greater than four, then the number of carbons of R_1 is less than or equal to two and the number of carbons of Q is less than or equal to eight; and
(f) when W_1 is S, then R is H, A is A-1, and Y is CH_3, OCH_3, OC_2H_5, CH_2OCH_3, C_2H_5, CF_3, SCH_3, $OCH_2CH{=}CH_2$, $OCH_2C{\equiv}CH$, $OCH_2CH_2OCH_3$, $CH(OCH_3)_2$ or

29. A method for controlling the growth of undesired vegetation which comprises applying to the locus to be protected an effective amount of a compound of claim **1**.

4,707,179
HERBICIDAL ORTHO-HETEROCYCLIC SULFONAMIDES

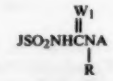
Mark E. Thompson, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 753,118, Jul. 11, 1985, Pat. No. 4,657,578, which is a continuation-in-part of Ser. No. 671,851, Nov. 15, 1984, abandoned. This application Feb. 17, 1987, Ser. No. 944,814

Int. Cl.[4] C07D *401/12, 401/14;* **A01N** *43/66, 43/72*

U.S. Cl. 71—90 **30 Claims**

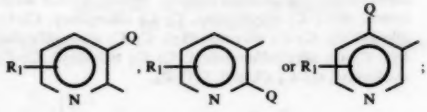
1. A compound of the formula:



I

wherein

J is



J-1 J-2 J-3

W_1 is O or S;

R is H or CH_3;

R_1 is H, C_1–C_3 alkyl, C_1–C_3 haloalkyl, halogen, nitro, C_1–C_3 alkoxy, $SO_2NR^IR^{II}$, C_1–C_3 alkylthio, C_1–C_3 alkylsulfinyl, C_1–C_3 alkylsulfonyl, CO_2R^{III}, C_1–C_3 haloalkoxy, amino, C_1–C_3 haloalkylthio, di(C_1–C_3 alkyl)amino, CH_2CN, CH_2OCH_3 or CH_2SCH_3;

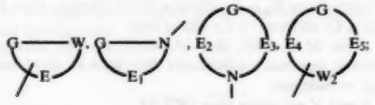
R^I is H, C_1–C_4 alkyl, C_2–C_3 cyanoalkyl, methoxy or ethoxy;

R^{II} is H, C_1–C_4 alkyl or C_3–C_4 alkenyl; or

R^I and R^{II} may be taken together as —$(CH_2)_3$—, —$(CH_2)_4$—, —$(CH_2)_5$— or —$CH_2CH_2OCH_2CH_2$—;

R^{III} is C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, C_2–C_4 haloalkyl, C_2–C_3 cyanoalkyl, C_5–C_6 cycloalkyl, C_4–C_7 cycloalkylalkyl or C_2–C_4 alkoxyalkyl;

Q is



Q_1 Q_2 Q_3 Q_4

G is C=O or SO_2;

W is O, S, CHR_2 or NR_3;

W_2 is O, S, SO_2, CHR_2 or NR_3;

R_2 is H, C_1–C_2 alkyl, Cl, F or Br;

R_3 is H, C_1–C_4 alkyl, C_1–C_4 haloalkyl, C_2–C_4 alkoxyalkyl, C_2–C_4 cyanoalkyl, C_3–C_4 alkenyl or C_3–C_4 alkynyl;

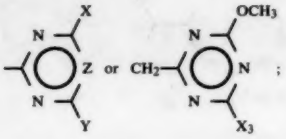
E and E_1 independently are C_3–C_4 alkylene, alkenylene or alkenyldienyl;

E_2 and E_4 independently are C_1–C_2 alkylene or C_2 alkenylene;

E_3 and E_5 independently are C_2–C_3 alkylene or alkenylene; and

E, E_1, E_2, E_3, E_4 and E_5 may optionally be substituted by 1–4 groups selected from C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 alkenyl, OH, halogen or C_1–C_4 haloalkoxy; further, when W is O, CHR_2 or NR_3, one of the carbon atoms of E may be in the form of a carbonyl group, and when W_2 is O, CHR_2 or NR_3, one of the carbon atoms of E_4 or E_5 may be in the form of a carbonyl group, provided that said carbonyl groups are not bonded directly to G;

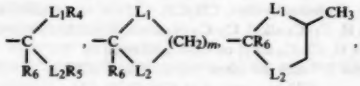
A is



A-1 A-6

X is H, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 haloalkoxy, C_1–C_4 haloalkyl, C_1–C_4 haloalkylthio, C_1–C_4 alkylthio, C_2–C_5 alkoxyalkyl, C_2–C_5 alkoxyalkoxy, amino, C_1–C_3 alkylamino or di(C_1–C_3 alkyl)amino;

Y is H, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 haloalkoxy, C_1–C_4 haloalkylthio, C_1–C_4 alkylthio, halogen, C_2–C_5 alkoxyalkyl, C_2–C_5 alkoxyalkoxy, amino, C_1–C_3 alkylamino, di(C_1–C_3 alkyl)amino, C_3–C_4 alkenyloxy, C_3–C_4 alkynyloxy, C_2–C_5 alkylthioalkyl, C_1–C_4 haloalkyl, C_3–C_5 cycloalkyl, C_2–C_4 alkynyl, C(O)R_6,



N(OCH_3)CH_3, C_2–C_5 alkylsulfinylalkyl, or C_2–C_5 alkylsulfonylalkyl;

m is 2 or 3;

L_1 and L_2 are independently O or S;

R_4 and R_5 are independently C_1–C_2 alkyl;

R_6 is H or CH_3;

Z is N; and

X_3 is CH_3 or OCH_3;

and their agriculturally suitable salts; provided that

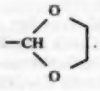
(a) when G is SO_2, then W is O, CHR_2 or NR_3;

(b) when E_2 and E_4 are C_2 alkylene or C_2 alkenylene, then E_3 and E_5 are C_2 alkylene or alkenylene;

(c) X or Y is other than OCF_2H;

(d) when the total number of carbon atoms of X and Y is greater than four, then the number of carbons of R_1 is less than or equal to two and the number of carbons of Q is less than or equal to eight; and

(e) when W_1 is S, then R is H, A is A-1, and Y is CH_3, OCH_3, OC_2H_5, CH_2OCH_3, C_2H_5, CF_3, SCH_3, $OCH_2CH{=}CH_2$, $OCH_2C{\equiv}CH$, $OCH_2CH_2OCH_3$, $CH(OCH_3)_2$ or



23. A method for controlling the growth of undesired vegetation which comprises applying to the locus to be protected an effective amount of a compound of claim **1**.

4,707,180
HERBICIDALLY ACTIVE ISOXAZOLYL-IMIDAZOLIDINONE DERIVATIVES

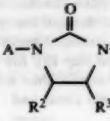
James A. Schwindeman, Fairlawn, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jun. 14, 1985, Ser. No. 744,728

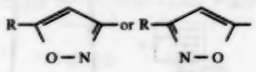
Int. Cl.[4] A01N *43/50;* **C07D** *233/22*

U.S. Cl. 71—92 **4 Claims**

1. A compound of the formula:



wherein A is

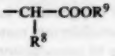


wherein:

R is up to C_6 alkyl, haloalkyl or cycloaklyl, up to C_5 alkenyl or alkynyl; $—R^4—O—R^5$ or $—R^4—S—R^5$ wherein R^4 is up to C_6 alkylene and R^5 is up to C_6 alkyl or phenyl or benzyl;

R^1 is up to C_3 alkyl or allyl;

R^2 and R^3 are selected from hydrogen, hydroxy or $—NR^6R^7$ with the proviso that one of R^2 or R^3 must be $—NR^6R^7$, wherein R^6 is selected from hydrogen or up to C_6 alkyl or haloalkyl; and R^7 is



wherein R^8 is selected from hydrogen, up to C_6 alkyl or haloalkyl, phenyl or benzyl; and R^9 is selected from alkali metal, hydrogen, up to C_6 alkyl, haloalkyl or alkoxyalkyl, phenyl.

4. The method of controlling the growth of weeds wherein a herbicidally effective amount of herbicide is applied to a growth medium prior to emergence of weeds therefrom or to the weeds subsequent to emergence from the growth medium wherein the improvement resides in using as the herbicide a compound or mixture of compounds as defined in claim 1.

4,707,181

1-ARYL-1,4-DIHYDRO-4-OXO-3,5-DICARBOXYPYRIDAZINE DERIVATIVES AND THEIR USE AS PLANT GROWTH REGULATORS AND HYBRIDIZING AGENTS

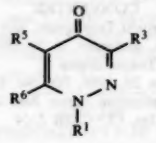
Dennis R. Patterson, North Wales, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Continuation of Ser. No. 193,672, Oct. 3, 1980, abandoned. This application Aug. 30, 1982, Ser. No. 413,010

Int. Cl.[4] **A01N** *43/58;* **C07D** *237/24, 309/38*

U.S. Cl. 71—92 **10 Claims**

1. A compound of the formula



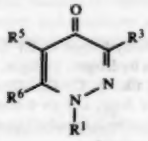
wherein:

R^1 is (a) an unsubstituted aryl group or aryl group substituted with up to three substituents selected from the group consisting of halogen, nitro, trihalomethyl, $(C_1–C_4)$alkoxy, $(C_1–C_4)$alkyl and cyano groups, or (b) $(C_1–C_4)$alkyl group;

R^3 and R^5 are a carboxy (COOH) group, a carbalkoxy (COOR) group or a carbamide (CONRR) group wherein R is an alkyl group; and

R^6 is a $(C_1–C_4)$alkyl group, an unsubstituted aryl group or an aryl group substituted with up to three substituents selected from the group consisting of halogen, nitro, trihalomethyl, $(C_1–C_4)$alkyl and cyano groups; and the agronomically acceptable alkali metal salts and acid addition salts thereof.

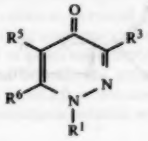
2. A compound of the formula



wherein

R^1 is a phenyl or naphthyl group substituted with up to three substituents selected from the group consisting of halogen, nitro, trihalomethyl, $(C_1–C_4)$alkoxy, $(C_1–C_4)$alkyl, and cyano; R^3 and R^5 are a carboxy (COOH) group, a carbalkoxy (COOR) group or a carbamide (CONRR) group wherein R is an alkyl group; and R^6 is a $(C_1–C_4)$alkyl group; and the agronomically acceptable alkali metal salts and acid addition salts thereof.

10. A compound of the formula



wherein:

R^1 is a $(C_1–C_4)$alkyl group, an unsubstituted phenyl group or a phenyl group substituted with up to three substituents selected from the group consisting of halogen, nitro, trihalomethyl, $(C_1–C_4)$alkoxy, $(C_1–C_4)$alkyl and cyano groups,

R^3 and R^5 are each independently a carboxy (COOH) group, a carbalkoxy (COOR) group or a carbamide (CONRR) group wherein R is a $(C_1–C_4)$alkyl group;

R^6 is a $(C_1–C_4)$alkyl group, an unsubstituted phenyl group or a phenyl group substituted with up to three substituents selected from the group consisting of halogen, nitro, trihalomethyl, $(C_1–C_4)$alkyl and cyano; and the agronomically acceptable alkali metal salts and acid addition salts thereof.

4,707,182

PHENOXINE-KETAL ETHERS, COMPOSITIONS CONTAINING THEM AND THE USE THEREOF

Henry Martin, Allschwil, and Urs Fricker, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

ley, N.Y.

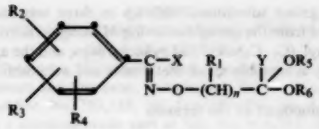
Division of Ser. No. 473,905, Mar. 10, 1983, Pat. No. 4,530,716. This application May 13, 1985, Ser. No. 733,353

Claims priority, application Switzerland, Mar. 15, 1982, 1609/82

Int. Cl.[4] **A01N** *43/40, 43/08;* **C07D** *317/16, 319/06*

U.S. Cl. 71—94 **12 Claims**

1. An oxime ether of the formula



wherein

n is 1 or 2;

each of R_1 and R_2 is hydrogen or C_1–C_4-alkyl;

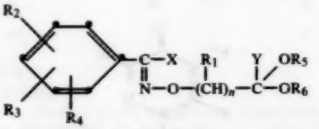
each of R_3 and R_4 is hydrogen, halogen, C_1–C_4 alkyl, C_1–C_4 haloalkyl, C_1–C_4 alkoxy, C_1–C_4 haloalkoxy or nitro;

R_5 and R_6 together form a 3 to 4-membered alkylene or alkenylene bridge which unsubstituted or substituted by 1 or 2 C_1–C_4 alkyl groups;

X is fluorinated C_1–C_3 alkyl radical which may also additionally contain chlorine; and

Y is hydrogen, C_1–C_4 alkyl or C_1–C_4 alkoxy.

8. A method of protecting rice, sorghum, wheat and maize crops from the phytoxic action of thiocarbamate, triazinone haloacetanilide, phenoxyphenoxypropionate, pyridyloxyphenoxypropionate or dinitroaniline herbicides, which comprises adding to the herbicides, applying to the locus of the crops, or applying to the seeds of said crops, as antidote, a compound of the formula



wherein

n is 1 or 2;

each of R_1 and R_2 is hydrogen or C_1–C_4-alkyl;

each of R_3 and R_4 is hydrogen, halogen, C_1–C_4 alkyl, C_1–C_4 haloalkyl, C_1–C_4 alkoxy, C_1–C_4 haloalkoxy or nitro;

R_5 and R_6 together form a 3 to 4-membered alkylene or alkenylene bridge which is unsubstituted or substituted by 1 or 2 C_1–C_4 alkyl groups;

X is fluorinated C_1–C_3 alkyl radical which may also additionally contain chlorine; and

Y is hydrogen, C_1–C_4 alkyl or C_1–C_4 alkoxy.

4,707,183

METHOD OF OPERATING A BLAST FURNACE WITH PLASMA HEATING

Jean A. Michard, Ville d'Avray, and Lucien De Saint-Martin, Metz, both of France, assignors to Institut de Recherches de la Siderurgie Francaise (Irsid), Maizieres, les Metz, France

Filed Nov. 21, 1985, Ser. No. 800,465

Claims priority, application France, Nov. 21, 1984, 84 18075

Int. Cl.[4] C21B *5/52*

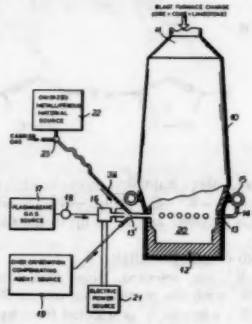
U.S. Cl. 75—10.22 **17 Claims**

1. A method of operating a top-charged blast furnace having a tuyere zone at which a blast of gas is injected into said furnace below a charge containing iron ore and coke so that with said blast, iron produced by reduction of the ore with the coke is smelted in a normal blast furnace iron and steel making operation for a normal rate of iron production with a certain gaseous oxygen content of the blast in the absence of heat supplied from a source other than reaction of the coke with the blast, said method comprising the steps of:

(a) introducing said charge into the top of said furnace, feeding said blast of gas into said tuyere zone, and collecting molten metal below said tuyere zone;

(b) for temporarily increasing the iron output of said furnace injecting directly into said furnace at said zone laterally particles of oxidized metalliferous material;

(c) introducing into said furnace directly in said zone a gas stream previously heated by electric energy to deliver to said charge and said zone thermal energy in an amount sufficient to supply the thermal energy required for smelting reduction of the oxidized metalliferous material injected into said zone in step (b), the injection of said oxidized metalliferous material into said zone inducing an over oxygenation in said zone; and



(d) controlling the blast used, introducing into said zone laterally and directly a compensating agent for compensating for said over oxygenation induced by the injection of said oxidized metalliferous material in said zone, and controlling the rate of introduction of said compensating agent to ensure that smelting reduction of said charge proceeds above said zone in conformity with said normal blast furnace iron and steel making operation in spite of the injection of said oxidized metalliferous material into said zone and the reduction of the gaseous oxygen content of the blast used.

4,707,184

POROUS METAL PARTS AND METHOD FOR MAKING THE SAME

Don H. Hashiguchi, University Heights, and Erhard Klar, Beachwood, both of Ohio, assignors to SCM Metal Products, Inc., Cleveland, Ohio

Filed May 31, 1985, Ser. No. 740,088

Int. Cl.[4] B22F *1/00*

U.S. Cl. 75—228 **5 Claims**

1. A gas permeable or highly porous noncompacted article having a porosity of from 40% to 60% and a pore size less than 300 micrometers and being of irregular configuration comprising a sintered structure of dispersion strengthened metal or dispersion strengthened metal alloy particles.

4,707,185

METHOD OF TREATING THE SLAG FROM A COPPER CONVERTER

Takayoshi Kimura; Seiichi Tsuyuguchi, and Yoshiaka Mori, all of Niihama, Japan, assignors to Sumitomo Metal Mining Company Limited, Tokyo, Japan

Filed Jan. 29, 1986, Ser. No. 823,631

Claims priority, application Japan, Jan. 31, 1985, 60-17518

Int. Cl.[4] C22B *7/04*

U.S. Cl. 75—24 **6 Claims**

1. A method of concentration copper and recovering metallic impurities from a molten slag from a copper converter which includes copper and metallic impurities, said metallic impurities including lead, zinc, nickel, cobalt, tin, bismuth, arsenic and antimony, said method comprising the steps of:

(a) introducing said molten slag into a furnace having tuyeres through which pulverized coal and air can be blown into said molten slag below its surface;

(b) blowing at least 6% by weight of pulverized coal, based on the weight of the slag, together with air or oxygen-enriched air having an oxygen content of 21 to 40% by

volume through said tuyeres and into said molten slag such that molten metallic copper will precipitate from the slag, said molten metallic copper absorbing most of said metallic impurities as its precipitates, the amount of said air blown into said slag being 0.3 to 0.7 of the theoretical amount needed for complete combustion of said pulverized coal;

(c) adding a source of sulfur to said precipitated molten metallic copper to form a molten matte having said metallic impurities therein;

(d) subjecting said molten matte to a reduced pressure of up to and including 0.6 mm Hg for at least five minutes in a vacuum refining apparatus to volatilize most of said metallic impurities from said molten matte, leaving a copper-enriched matte;

(e) recovering said volatized metallic impurities; and

(f) conveying said copper-enriched matte into a copper converter.

4,707,186 Claims
Patent Not Issued For This Number

4,707,187
MORTAR ADMIXTURE

Kenji Tsuda, and Hajime Namikoshi, both of Himeji, Japan, assignors to Daicel Chemical Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 741,977, Jun. 6, 1985, abandoned. This application Oct. 7, 1986, Ser. No. 916,242
Claims priority, application Japan, Jun. 7, 1984, 59-115514
The portion of the term of this patent subsequent to Nov. 17, 2004, has been disclaimed.
Int. Cl.[4] C04B *24/38*
U.S. Cl. 106—93 **2 Claims**

1. A mortar composition, consisting essentially of:

mortar consisting essentially of hydraulic inorganic cement, water and fine aggregate; and

from 0.05 to 1.0 part by weight of carboxymethylhydroxyethylcellulose (CMHEC), per 100 parts by weight of said mortar for improving the trowellability and spreadability of the mortar, said CMHEC having a carboxymethyl degree of substitution of from 0.01 to 0.7 per anhydroglucose unit, said CMHEC having an ethylene oxide molar substitution of 3.10 to 4.65 per anhydroglucose unit, a 1% aqueous solution of said CMHEC having a viscosity of 50 to 7000 cps, at 25° C.

4,707,188
CEMENT COMPOSITION FOR UNDERWATER CONCRETING

Kenji Tsuda; Nobuyoshi Matsumoto, and Masahide Tsukagawa, all of Himeji, Japan, assignors to Daicel Chemical Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 741,978, Jun. 6, 1985, abandoned. This application Oct. 7, 1986, Ser. No. 916,243
Claims priority, application Japan, Jun. 7, 1984, 59-115515
Int. Cl.[4] C04B *24/38*
U.S. Cl. 106—93 **6 Claims**

1. A cement composition, consisting essentially of:

water, aggregate, 100 parts by weight of hydraulic inorganic cement, and from 0.1 to 2.0 parts by weight of carboxymethylhydroxyethylcellulose (CMHEC), said CMHEC having a carboxymethyl degree of substitution of from 0.01 to 2.0 per anhydroglucose unit, said CMHEC having an ethylene oxide molar substitution of at least 3.03 to 7.0 per anhydroglucose unit, a 1% aqueous solution of said CMHEC having a viscosity of 100 to 7000 cps, at 25° C. so that said CMHEC reduces the amount of the cement that diffuses into water, and maintains a low air entrainability and a fluidity suitable for pumping of the cement composition.

4,707,189
BIOSTABLE COMPOSITIONS AND THE AQUEOUS SOLUTIONS THEREOF AS THICKENERS FOR AQUEOUS-BASED SYSTEMS

Robert G. Nickol, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Continuation of Ser. No. 669,138, Nov. 7, 1984, abandoned. This application Jun. 10, 1986, Ser. No. 873,108
Int. Cl.[4] C08L *1/08, 1/26, 5/00*
U.S. Cl. 106—176 **18 Claims**

1. An essentially water-free biostable composition consisting essentially of a powder concentrate of at least one anionic water-soluble polymer containing carboxylate or sulfonate groups selected from the group consisting of sodium carboxymethylcellulose, carboxymethylhydroxyethyl cellulose, sulfoethylhydroxyethyl cellulose, prepared gums and natural gums and at least one cationic quaternary ammonium salt surfactant in a ratio, expressed as moles surfactant divided by mole equivalents of carboxylate or sulfonate groups in the polymer, of from about 0.025 to about 2.0, which composition is capable of forming a highly viscoelastic solution when mixed in an aqueous medium.

4,707,190
PROCESS FOR SEPARATING MALTOSE FROM MIXTURES OF MALTOSE, GLUCOSE AND OTHER SACCHARIDES

Walter H. Goodman, Oak Park, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Sep. 2, 1986, Ser. No. 902,739
Int. Cl.[4] C13J *1/06*
U.S. Cl. 127—46.2 **6 Claims**

1. A process for separating maltose from a mixture of maltose, glucose and at least one polysaccharide which comprises contacting said mixture at adsorption conditions with an adsorbent comprising a dealuminated Y zeolite having about 5-9 aluminum atoms per unit cell, selectively adsorbing said maltose, removing the nonadsorbed portion of said mixture from contact with said adsorbent and thereafter recovering high purity maltose by desorption with a desorbent comprising water at desorption conditions.

4,707,191
PICKLING PROCESS FOR HEAT-RESISTANT ALLOY ARTICLES

Robert Martinou, Bry sur Marne, and Michel Ruimi, Paris, both of France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation (SNECMA), France

Continuation of Ser. No. 707,965, Mar. 4, 1985, abandoned. This application Jan. 29, 1987, Ser. No. 9,096
Claims priority, application France, Mar. 9, 1984, 84 04169
Int. Cl.[4] C23G *1/02*
U.S. Cl. 134—3 **19 Claims**

1. A pickling process for heat resistant articles formed from a nickel alloy having a molybdenum content of at least 3.5% comprising the steps of:

(a) descaling surface layer oxides from the article by:

(i) immersing the articles in an acid or alkaline bath; and,

(ii) subsequently immersing the articles in an alkaline permanganate bath;

(b) immersing the articles in a bath of a mixture of 15–55% hydrochloric acid; nitric acid; 6–15% acetic acid; 7–15% phosphoric acid; 8–20% water; and a ferric salt for a period of between 3 and 10 minutes to clean oxysulfides from the articles;

(c) maintaining the temperature of the bath between 20° and 35° C.;

(d) removing the articles from the acid mixture bath and immersing them in a plurality of water rinse baths; and then

(e) ultrasonically agitating at least one of the water rinse baths.

4,707,192

NICKEL-BASE SINGLE CRYSTAL SUPERALLOY AND PROCESS FOR PRODUCTION THEREOF

Michio Yamazaki, Zushi; Toshihiro Yamagata, Yokohama, and Hiroshi Harada, Koganei, all of Japan, assignors to National Research Institute for Metals, Tokyo, Japan

Continuation of Ser. No. 704,094, Feb. 22, 1985, abandoned. This application Feb. 12, 1987, Ser. No. 15,531

Claims priority, application Japan, Feb. 23, 1984, 59-31424

Int. Cl.[4] C22F *1/10*

U.S. Cl. 148—3 **24 Claims**

17. A process for producing a nickel-base single crystal superalloy, which comprises directionally solidifying a material having a composition consisting essentially of, by weight,

Cr 4.5–10%,

W 7.5–20%,

Al 4.5–6%,

Ta 2–12%,

Co 5–10%,

Ni substantially being the balance,

W+Ta=17–24%,

W+Ta+Cr=22–30%,

to form a single crystal alloy, heating the single crystal alloy to a temperature of 1300° to 1360° C. (2372° to 2480° F.) to dissolve the gamma prime phase in the matrix gamma phase, air cooling it to below a temperature of 800° C. (1472° F.), and again heating it to a temperature of 760° to 1100° C. (1400° to 2012° F.) to precipitate the gamma prime phase.

4,707,193

METHOD FOR ACTIVATING METAL SURFACES PRIOR TO ZINC PHOSPHATION

Heinz Portz, Roesrath, and Reinhard Opitz, Duren, both of Fed. Rep. of Germany, assignors to Gerhard Collardin Gesellschaft mit beschraenkter Haftung, Cologne, Fed. Rep. of Germany

Filed Nov. 24, 1986, Ser. No. 933,832

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1985, 3541997

Int. Cl.[4] C23C *22/80, 22/12*

U.S. Cl. 148—6.15 Z **24 Claims**

1. In a method for phosphating at least one metal surface comprised of iron, steel, zinc, galvanized iron or steel, aluminum, aluminized iron or steel, or alloys of the foregoing, in which said surface is (1) cleaned and rinsed, (2) subjected to an activating bath, and then (3) phosphated using a phosphating bath comprising zinc ions and phosphate ions in aqueous solution, the improvement comprising using as said activating bath an aqueous alkaline solution with a pH of about 8–10 consisting essentially of:

(A) at least one water soluble alkali metal borate or alkaline earth metal borate;

(B) titanium ions present in up to 100 ppm; and

(C) phosphate ions present in up to 3,000 ppm; wherein the weight ratio phosphate:borate (as B_2O_7) is 1:more than 1.

4,707,194

PROCESS FOR THE PRODUCTION OF BEARING MATERIALS

Barry J. Eastwood, Aylesbury, England, assignor to AE PLC, Rugby, England

Filed May 16, 1986, Ser. No. 863,711

Claims priority, application United Kingdom, May 28, 1985, 8513330

Int. Cl.[4] C22F *1/04*

U.S. Cl. 148—11.5 A **11 Claims**

1. A process for the production of an aluminium-based bearing material having a steel backing and a composition, expressed in weight percent, consisting essentially of 8 to 35 tin, 1 to 3 copper, 2 to 10 silicon and remainder aluminium apart from incidental impurities comprising the steps of producing a desired alloy composition in suitable form, bonding the alloy to steel backing, raising the temperature of the bonded material to a temperature of at least 400° C. but less than 525° C. and wherein the aggregate time to heat to temperature and the dwell time at temperature lies within the range from 240 minutes to 60 seconds and subsequently cooling said bonded material at a cooling rate of at least 50° C./minute for at least part of the temperature drop to ambient temperature.

4,707,195

ALUMINUM ALLOY SHEET FOR CONTAINERS EXCELLENT IN CORROSION RESISTANCE AND METHOD OF PRODUCING SAME

Shin Tsuchida, Nagoya, and Hideo Ito, Gifu, both of Japan, assignors to Sumitomo Light Metal Industries, Ltd., Tokyo, Japan

Filed Oct. 12, 1984, Ser. No. 659,981

Claims priority, application Japan, Mar. 5, 1984, 59-040494

Int. Cl.[4] C22F *1/04*

U.S. Cl. 148—11.5 A **3 Claims**

2. A method for producing an aluminum alloy sheet for container excellent in corrosion resistance, said method consisting essentially of the steps of:

hot rolling a cast ingot composed of an aluminum alloy consisting essentially of, in weight percentages:

Mg: from 0.50 to 2.0%

Si: from 0.10 to 0.70%

Mn: from 0.30 to 1.5%

Cu: from 0.52 to 1.0%

and the balance being essentially aluminum;

then cold rolling said ingot to obtain an intermediate sheet with a thickness of at least one and a half times the thickness of said aluminum alloy sheet;

then heating said intermediate sheet to a temperature of 500° C. or higher and then rapidly cooling same from said heating temperature; and

final cold rolling said intermediate sheet to obtain said aluminum alloy sheet.

4,707,196

TI-NI ALLOY ARTICLES HAVING A PROPERTY OF REVERSIBLE SHAPE MEMORY AND A METHOD OF MAKING THE SAME

Toshio Honma; Minoru Nishida, and Kiyoshi Yamauchi, all of Sendai, Japan, assignors to Tohoku Metal Industries Ltd., Miyagi, Japan

Continuation of Ser. No. 470,532, Feb. 28, 1983, abandoned. This application Sep. 6, 1985, Ser. No. 773,435

Int. Cl.[4] C22F *1/10*

U.S. Cl. 148—12.7 N **9 Claims**

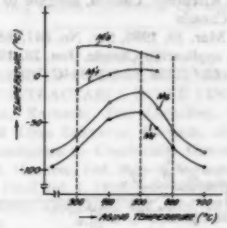
1. A method of making a Ti-Ni alloy article having a reversible shape memory effect from a Ti-Ni alloy consisting essentially, by atomic percent, of 50.3–53.0% Ni and the balance substantially Ti, which comprises the steps of:

preparing an ingot of said alloy by the melting method;

working said alloy ingot into a predetermined size and shape;

heat-treating said worked alloy at a temperature of 600° C. or more to make said alloy into a single phase of TiNi compound, and quenching it in water or oil from the heat-treated temperature; and

aging said alloy at a temperature below 600° C. but above



300° C. under mechanical constraint for deforming the alloy into a first shape and quenching the deformed alloy in water or oil from the aging temperature, to thereby provide said alloy with a dual phase structure of an intermetallic compound phase of TiNi and a precipitated Ni rich compound phase.

4,707,197

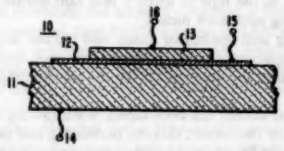
METHOD OF PRODUCING A SILICIDE/SI HETEROEPITAXIAL STRUCTURE, AND ARTICLES PRODUCED BY THE METHOD

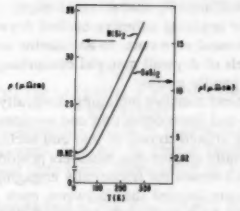
John C. Hensel; Anthony F. J. Levi, both of Summit, and Raymond T. Tung, New Providence, all of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Continuation-in-part of Ser. No. 637,060, Aug. 2, 1984, abandoned. This application Jan. 17, 1986, Ser. No. 820,581

Int. Cl.⁴ H01L *21/203*

U.S. Cl. 437—189 **8 Claims**





1. Method of forming a metal silicide/silicon heterostructure comprising a layer of silicon grown on a single crystal metal silicide substrate, the Si layer having a thickness t, the method comprising:

(a) depositing a first layer of silicon onto the silicide substrate, the first layer thickness t_1 being less than t, the substrate being at a template deposition temperature below about 300° C.;

(b) raising the temperature of the substrate with the first layer of silicon thereon to a bulk deposition temperature between about 500 degrees C. and about 800 degrees C.; and

(c) depositing silicon onto the first silicon layer, the substrate being maintained substantially at the

bulk deposition temperature, the amount of silicon deposited being the amount required to result in a Si layer of thickness t.

4,707,198

AMORPHOUS ALLOY AND PRODUCTION METHOD THEREOF

Kiyoshi Chiba, Chofu; Hiromitsu Iso, Machida, and Kazuto Tokumitsu, Tokyo, all of Japan, assignors to Teijin Limited, Osaka, Japan

PCT No. PCT/JP85/00502, § 371 Date Jun. 19, 1986, § 102(e) Date Jun. 19, 1986, PCT Pub. No. WO86/01835, PCT Pub. Date Mar. 27, 1986

PCT Filed Sep. 9, 1985, Ser. No. 876,889

Claims priority, application Japan, Sep. 10, 1984, 59-188109

Int. Cl.⁴ H01F *1/04*

U.S. Cl. 148—304 **4 Claims**

1. An amorphous alloy consisting of iron and tellurium and having a tellurium content of from about 14 to 90 atomic %.

4,707,199

NON NITROGLYCERIN-CONTAINING COMPOSITE-MODIFIED DOUBLE-BASE PROPELLANT

David C. Sayles, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 17, 1983, Ser. No. 543,397

Int. Cl.⁴ C06B *45/10*

U.S. Cl. 149—19.2 **1 Claim**

1. A crosslinked composite-modified double-base propellant composition comprising a casting powder portion and a casting solvent portion, said casting powder portion comprising about 72.0 weight percent of said propellant composition and said casting solvent portion comprising about 28.0 weight percent of said propellant composition, said casting powder portion comprised in part by weight of ingredients as follows:

nitrocellulose (12.5% nitrogen)	16.6
carboranylmethyl propionate	4.7
triacetin	17.5
2-nitrodiphenylamine	1.1
resorcinol	0.7
ammonium perchlorate (1 μm)	32.8
aluminum (20 μm)	7.2
aluminum staple (whiskers)	2.7
glycidyl azide polymer formed from hydrolysis of glycidyl chloride followed by reaction with sodium azide	16.0

, and said casting solvent portion comprised in parts by weight of ingredients as follows:

glycidyl azide	45.8
triacetin	52.7
hexane diisocyanate	0.50
triphenylbismuthine	0.07

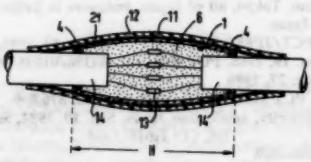
, said crosslinked composite-modified double-base propellant composition characterized by having greater safety in handling, reduced sensitivity to detonation, higher burning rate, higher specific impulse, and improved mechanical properties as compared with a like composition containing nitroglycerin in said casting powder portion and in said casting solvent portion in equivalent molar weight amounts to said glycidyl azide polymer.

4,707,200

WRAP FOR FILLING CAVITIES, PARTICULARLY IN CABLE FITTINGS, WITH INSULATING COMPOUND AND A METHOD FOR FILLING THE CAVITIES

Wolfgang Giebel, Planegg, and Heinrich Meixner, Halfing, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed May 21, 1986, Ser. No. 865,435
Claims priority, application Fed. Rep. of Germany, May 24, 1985, 3518815
Int. Cl.[4] H01B 13/08
U.S. Cl. 156—48 21 Claims



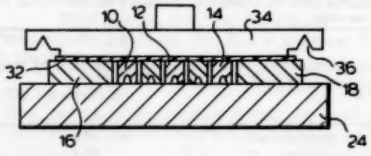
19. A method for filling cavities particularly in a cable splice comprising the steps of providing a wrapper having a mounting film with lateral edges, strips of adhesive material along each of the lateral edges on one surface, a flexible container being secured to said one surface, said container having means for forming an opening and having a predetermined quantity of insulating compound, securing the wrapper on the cable splice as a cover by winding the mounting film around the object with the adhesive along the lateral edges securing the film at the edges to form an enveloping cavity for the cover, prior to completing the winding of the film, opening the means for forming an opening and then completing the winding of the film to complete the cover, subsequently kneading the container and the wrapper to knead the compound from the container and into the spaces in the cavities of the cable splice being surrounded by the cover.

4,707,201

METHOD OF PRODUCING POLISHED BLOCK TYPE, SINGLE MODE, EVANSCENT WAVE DIRECTIONAL COUPLERS BY MEANS OF MASS PRODUCTION OF THE COUPLER HALVES

Michael Failes, Moffat, Canada, assignor to Canadian Instrumentation and Research Limited, Burlington, Canada

Filed Aug. 20, 1986, Ser. No. 898,100
Int. Cl.[4] B65H 69/06
U.S. Cl. 156—64 20 Claims



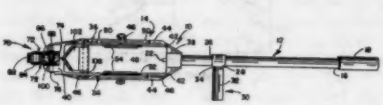
1. A process for the production of polished block, single mode, evanescent wave directional optical couplers which comprises producing a plurality of discrete coupler halves, each coupler half having an optical fiber imbedded in a substrate, grinding said coupler halves to remove a small portion of the cladding of the optical fiber to produce an oval shaped area of defined dimensions of the exposed fiber, mounting said ground coupler halves in a first holder in a coplaner manner, further working said coupler halves to an end point determined by an evanescent coupling measurement, and securing a pair of coupler halves together such that the optical fibers are in optical contact and in effective fusion with each other.

4,707,202

TAPE APPLICATOR

Henry D. Sweeny, Kitchener, Canada, assignor to Swenco Limited, Waterloo, Canada

Filed Mar. 20, 1986, Ser. No. 841,965
Claims priority, application Canada, Jun. 28, 1985, 485809
Int. Cl.[4] B32B 31/00; B44C 7/02
U.S. Cl. 156—71 21 Claims



1. A method of applying adhesive-backed drywall tape to a corner joint using a tape applicator having a head portion and a handle portion, the head portion including tape mounting means and a roller assembly having first and second applicator rollers thereon, said assembly being pivotable between upper and lower limit positions, said second applicator roller having a V-shaped surface profile, said first applicator roller being about half the width of said tape, and said head portion including latch means to hold said assembly in the lower limit position, the method comprising the steps of:

(a) loading a roll of drywall tape into said tape mounting means;

(b) snagging the free end of said tape on a serrated edge of a tape cutter adjacent said second applicator roller with said assembly latched in said lower limit position, with tape contacting said applicator rollers;

(c) orienting said applicator to place the tape adjacent said applicator rollers into the corner at one end thereof, the profile of each of said applicator rollers applying a setting pressure to the tape to force it into said corner;

(d) releasing said latch means;

(e) drawing said applicator along said corner, keeping said second applicator roller in the corner, and applying tape drawn from the tape roll to the corner-defining wall surfaces;

(f) when the corner has been taped, withdrawing said applicator from the corner, thereby permitting said assembly to return to its lower limit position under a spring bias where at it is held by said latch means, leaving a short length of tape between the corner and the applicator; and

(g) moving said applicator sharply downwards to sever said short length of tape by said serrated edge.

9. A device for applying adhesive-backed drywall tape provided in a roll wound on a core, to an interior corner defined by meeting panels of drywall material comprising:

(a) elongated handle means;

(b) a unitary head member including integrally formed side wall means and interconnecting end sections, said handle means being affixed to one of said end sections;

(c) a pair of axially aligned disc members positioned between said side wall means for frictionally engaging the ends of a tape roll core located therebetween, each disc member being affixed to a stub shaft rotatably journaled in the adjacent side wall means and being biased towards the interior of said head member;

(d) transversely spaced carrier means pivotally mounted to the other of said head member end sections;

(e) a generally cylindrical first applicator roller rotatably supported between said carrier means, said first applicator roller having a width about one half the width of the tape to be applied and adapted to apply said tape only along lines defined by the outer circumferential edges thereof to the drywall panels defining said corner;

(f) a second applicator roller rotatably supported between said carrier means, having a V-shaped surface profile and the same width as said first applicator roller and being adapted to stretch the tape initially applied by said first applicator roller into said corner for adherence to said panels; and

(g) tape cutting means operable to cut said tape.

4,707,203
METHOD OF PRODUCING HOSES WITH CONTRACTABLE INNER LININGS

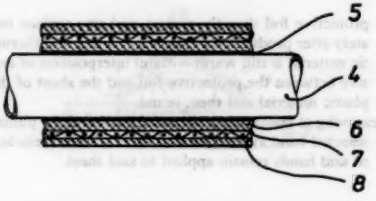
Anton Besche, Korbach; Jost Österling, Waldeck-Höringhausen, and Klaus Schwarze, Korbach, all of Fed. Rep. of Germany, assignors to Continental Gummi-Werke Aktiengesellschaft, Hanover, Fed. Rep. of Germany

Filed Jul. 2, 1986, Ser. No. 881,399

Claims priority, application Fed. Rep. of Germany, Jul. 6, 1985, 3524286

Int. Cl.[4] B32B *31/00, 31/26*

U.S. Cl. 156—85 **3 Claims**



1. In a method of producing a hose of natural or synthetic rubber remaining entirely flexible throughout although coping with a problem of fold formation, whereby the hose has an inner core made of a foil of thermoplastic synthetic material that is resistant to solvent and that serves as an inner core lining without any influence upon said hose remaining flexible, with the method including the steps of disposing a foil sleeve on a fabrication mandrel, then building-up on said foil sleeve a hose blank, with or without reinforcement layer means, and subsequently vulcanizing said hose blank, which simultaneously produces a bond between said hose blank and said foil sleeve, the improvement comprising the step of using as said foil sleeve a contractible foil sleeve for fold-free positioning of the inner core lining that during said disposing step has a diameter which is greater than the outer diameter of said fabrication mandrel, and that after said vulcanizing step forms a hose inner core that necessarily is free of folds and has a smooth surface, and removing the mandrel from the formed hose after vulcanization.

4,707,204
METHOD OF MAKING A FURNITURE FRONT ELEMENT

Otto Heeg, Ruedigheimer Strasse 9, D-6450 Hanau/Main, Fed. Rep. of Germany, assignor to Portas Deutschland GmbH, Frankfurt and Otto Heeg, Hanau, both of, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 324,022, Nov. 23, 1981, abandoned. This application Jul. 17, 1984, Ser. No. 631,759

Claims priority, application Fed. Rep. of Germany, Nov. 25, 1980, 8031386[U]; Mar. 11, 1981, 8106975[U]

Int. Cl.[4] B32B *31/10, 7/08*

U.S. Cl. 156—91 **2 Claims**

1. A method for manufacturing a front element for furniture or the like which includes a four sided perimeter frame and a filling panel received within the frame, said method comprising the steps of;

(a) cutting elongated frame pieces of wood or plastic to selected profile and length and having mitered corners, and sealing the surfaces cut,

(b) providing a filling piece receiving groove extending longitudinally along one face of each piece,

(c) forming at least one short hole extending in a longitudinal direction in each end of each frame piece extending from the mitered face,

(d) forming at least one additional bore hole of a diameter greater than the first mentioned bore hole adjacent each end of each frame piece extending from and normal to the rear face thereof and terminating within the piece and intersecting the first mentioned bore hole at a distance spaced longitudinally from said mitered face thereof,

(e) inserting a rotatable eccentric fitting within each of said additional bore holes,

(f) interconnecting three of said frame pieces by means of right angle dowel pieces inserted in adjoining holes in said mitered faces, each dowel piece having a reduced neck spaced inwardly from its end,

(g) rotating said eccentric fittings into the reduced necks of said dowels of the three frame pieces to draw the same tightly together,

(h) inserting at least one generally planar filling piece within the groove defined by the three interlocked frame pieces,

(i) joining the fourth frame piece to the partially assembled frame about the exposed edge of said filling piece by insertion of the right angle dowels associated therewith into the first mentioned holes in the adjacent frame pieces, and

(j) rotating the remaining eccentric fittings to tighten the assembly about the filling piece.

4,707,205
METHOD FOR MAKING AN INFLATABLE MANDREL

Marshall E. Bishop, 146 Riverside Dr., Apt. 3, Richwood, W. Va. 26261, and Duane E. Thewlis, 3323 S. Hametown Rd., Norton, Ohio 44203

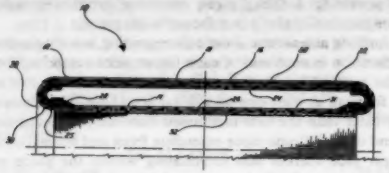
Division of Ser. No. 758,942, Jul. 25, 1985, Pat. No. 4,632,328. This application Sep. 25, 1986, Ser. No. 911,541

Int. Cl.[4] B32B *31/00*

U.S. Cl. 156—110.1 **3 Claims**

1. In a process for making an inflatable mandrel having a pair of membranes defining an inflation chamber configured to surround a supporting cylindrical surface so that a surface of one membrane contacts the cylindrical surface, the membranes being formed by laying up plies of fabric having a rubberized coating thereon upon a building drum and vulcanizating the plies together to form coherent membranes, the steps of: applying to a mandrel being formed, a fabric ply positioned to define

the membrane cylinder contacting surface on the mandrel when formed, the positioned fabric ply being coated on one



surface only and being positioned whereby the uncoated surface opposes the cylindrical surface.

4,707,206

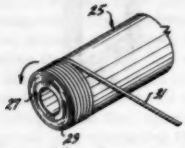
METHOD OF MAKING A FIBER REINFORCED PRODUCT

George E. Trepus, Jr., Enumclaw; Barry D. Matin, Kent, and Preston L. Rider, Kirkland, all of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Mar. 24, 1986, Ser. No. 843,127

Int. Cl.[4] B32B *31/20*

U.S. Cl. 156—187 **17 Claims**



1. A method of manufacturing fiber reinforced silicone elastomer product comprising the steps of:

(a) extruding an unreinforced silicone elastomer inner element containing two vulcanizing agents activated at different temperatures;

(b) partially curing said silicone elastomer inner element by heating said element to a temperature at or above the activation temperature of the lower temperature vulcanizing agent but below the activation temperature of the higher temperature vulcanizing agent;

(c) overwrapping said silicone elastomer inner element with a fabric reinforced, calendered sheet of uncured silicone elastomer containing a vulcanizing agent to create an overwrapped element; and,

(d) applying external pressure to the overwrapped element while heating the overwrapped element to activate the second vulcanizing agent of the silicone elastomer inner element and the vulcanizing agent of the overwrapping sheet.

4,707,207

METHOD FOR PROCESSING AND APPLYING A PROTECTIVE FOIL

Heinz G. Baus, Wartbodenstrasse 35, CH-3626 Hünibach-Thun, Switzerland

Filed Sep. 24, 1985, Ser. No. 779,638

Claims priority, application Fed. Rep. of Germany, Sep. 29, 1984, 3435906

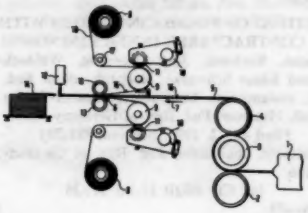
Int. Cl.[4] B32B *31/18*

U.S. Cl. 156—252 **9 Claims**

1. A method of processing a protective foil, of applying said foil over at least one surface of a sheet made of thermoplastic synthetic material and having a lengthwise and a transverse direction, and of using said thus surface-protected sheet, said method comprising:

cutting spaced perforations through said protective foil with said perforations aligning in at least one of said directions and defining narrow parallel bands extending along said at least one direction;

then applying said protective foil over said at least one surface of said sheet to be protected by pressing said



protective foil directly against said one surface immediately after production of said sheet while said thermoplastic material is still warm without interposition of an adhesive between the protective foil and the sheet of thermoplastic material and then, in use,

removing at least a selected one of said bands by pulling said selected band away from said sheet while unselected ones of said bands remain applied to said sheet.

4,707,208

METHOD FOR COVERING A LENS BLANK WITH A PROTECTIVE PLASTIC FILM

Richard Crumbach; Manfred Gillner, both of Aachen; Heinz J. Schilde, Wuerselen, and Helmut Tiedemann, Baesweiler, all of Fed. Rep. of Germany, assignors to Saint-Gobain Vitrage, Courbevoie, France

Continuation of Ser. No. 514,506, Jul. 18, 1983, abandoned. This application May 27, 1986, Ser. No. 869,851

Claims priority, application France, Jul. 19, 1982, 82 12542

Int. Cl.[4] B32B *31/00*; B65C *9/28*

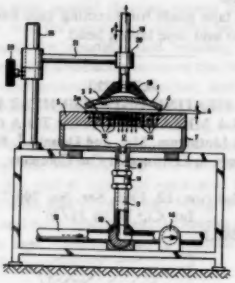
U.S. Cl. 156—285 **12 Claims**

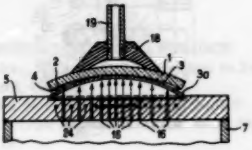
1. A method for covering a concave face of a glass blank with a piece of protective plastic film comprising the steps of:

positioning the blank and the piece of film in juxtaposition but separate, the outer edge of the piece of film being unrestrained for upward movement by a holding device on which said film is mounted, said blank and and piece of film being positioned substantially horizontally and aligned so that said blank is directly above said piece of film, the piece of film having an area being approximately equal to the area of the concave face of the glass blank;

applying gas pressure nonuniformly to said piece of protective film so as to propel the entire piece of film upward toward the concave face of the blank so that contact between the piece of film and the concave face of the blank is made initially at one point at a central portion of the concave face of the blank and so that contact between the piece of film and the concave face of the blank advances radially outward from the initial contact point toward the edge of the concave face of the blank, said

piece of film being supported while being propelled toward said blank only by said gas pressure; and





applying sufficient heat and pressure to joint the piece of film and the blank.

4,707,209

METHOD OF MAKING HIGH DENSITY MOISTURE RESISTANT MICA SHEET

Arthur F. Doyle, Portsmouth, and Dennis J. Sklarski, Deerfield, both of N.H., assignors to Essex Group, Inc., Fort Wayne, Ind.

Division of Ser. No. 627,244, Jul. 2, 1984, abandoned. This application Sep. 3, 1985, Ser. No. 772,095

Int. Cl.[4] C09J *5/02*

U.S. Cl. 156—307.4 **3 Claims**

1. A method of making mica composite laminates comprising:

individually impregnating a plurality of mica papers with about 5% to about 14% by weight of a polysiloxane binder containing about 1% to about 4% by weight of a monoalkoxy titanate and about 0.5% to about 2% by weight of a naphthenate in an aromatic solvent, removing the aromatic solvent, stacking the solvent free mica papers, one on top of another, and densifying under pressure and temperature until the binder is cured, wherein the composite has a density greater than about 1.5 g/cc and can withstand immersion in boiling water for 1 hour without delaminating.

4,707,210

PLASMA CVD APPARATUS

Teruo Misumi, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

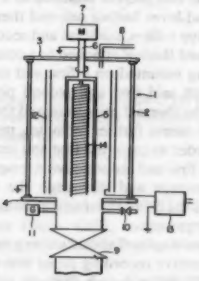
Continuation of Ser. No. 628,853, Jul. 9, 1984, abandoned. This application Apr. 28, 1986, Ser. No. 858,083

Claims priority, application Japan, Jul. 15, 1983, 58-129082

Int. Cl.[4] C23C *2/32*

U.S. Cl. 156—345 **1 Claim**

1. A plasma CVD apparatus comprising a vacuum chamber for forming and for etching a deposition film containing silicon on a cylindrical substrate to be treated, a gas introducing means for introducing a fluorine compound gas and a gas for forming a deposition film into the vacuum chamber, a gas discharging means for discharging the gases in the vacuum chamber, a leaking means for returning pressure in the vacuum chamber to atmospheric pressure, a high frequency-introducing means for introducing to the vacuum chamber high frequency energy for generating a plasma atmosphere of the fluorine compound gas for etching and for generating a plasma



atmosphere of the gas for forming the deposition film, a high frequency power source for supplying the high frequency energy to the high frequency introducing means, a supporting means for supporting the cylindrical substrate to be treated, and a heating means for heating from the inside the cylindrical substrate to be treated, wherein the surface of the walls of the vacuum chamber and the high frequency-introducing means to be exposed to the plasma atmospheres are aluminum.

4,707,211

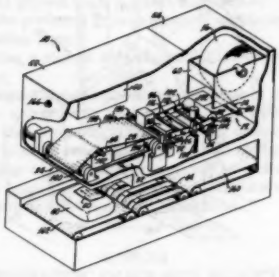
LINERLESS THERMAL LABEL PRINTER AND APPLICATOR

Tomoo Shibata, Irvine, Calif., assignor to Ricoh Electronics, Inc., Santa Ana, Calif.

Filed Feb. 10, 1986, Ser. No. 827,621

Int. Cl.[4] B26D *5/20*; B32B *35/00*

U.S. Cl. 156—354 **9 Claims**



1. A thermal printer and label applicator for use with thermosensitive recording paper comprising a substrate, a thermosensitive color-forming layer disposed on one side of the substrate, and a delayed action adhesive disposed on an opposite side of the substrate, said delayed action adhesive becoming tacky upon the application of heat thereto, said printer and applicator comprising:

transport means for moving the thermosensitive recording paper from a stack or roll thereof to a printing station and a cutting station, said transport means including a pair of

drive rollers disposed for engaging the thermosensitive recording paper therebetween;

thermal print head means disposed at said printing station for causing a preselected heating pattern in said thermosensitive recording paper in order to form desired visible images in the thermosensitive color-forming layer;

lever means for coordinated engagement and disengagement of the thermal print head means and the drive roller means with the thermosensitive recording paper, said lever means including a first and a second lever, said first lever having one end thereof attached to a thermal print head, said second lever having one end thereof attached to one of said drive rollers, said first and second levers having an opposite end thereof attached to a common shaft and each lever being mounted on a first and second pivot, respectively, with said first and second pivots being disposed between the thermal print head and the drive roller means, said lever means further including means for moving the shaft in order to cause the first and second levers to rotate about the first and second pivots, respectively, to simultaneously engage and disengage the thermal print head means and the drive roller means with the thermosensitive recording paper;

cutting means disposed at said cutting station for cutting the thermosensitive recording paper into separated individual labels with visible images thereon;

means for handling the separated individual labels without contact with the delayed action adhesive;

heating means disposed at an adhesive activation station for heating delayed action adhesive disposed on said separated individual labels in order to cause the delayed action adhesive to become tacky; and,

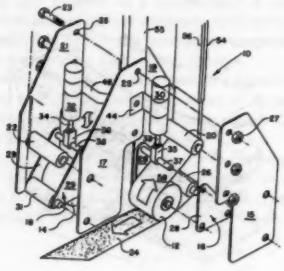
means for discharging the separated individual labels with tacky adhesive thereon.

4,707,212

AUTOMATED TAPE LAYING MACHINE FOR COMPOSITE STRUCTURES

Samuel I. Hailey, and John W. Alden, both of Fort Worth, Tex., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 28, 1986, Ser. No. 856,544
Int. Cl.[4] B32B *31/18*; B31F *1/00*
U.S. Cl. 156—361 **13 Claims**



1. An automated machine for laying tape upon a form comprising:

(a) a guide mechanism for positioning a movable plotting platform above the form to be laminated;

(b) a movable parallel supply structure separate from said movable plotting structure for supplying the tape;

(c) a tape laying head mounted upon said movable plotting structure for laying the tape on the form, the tape laying head comprising:

(i) two side by side tape laydown rollers for pressing said tape onto the form;

(ii) a vertical positioning mechanism for raising and lowering each of said rollers individually; and

(iii) tape routing means for routing the tape onto said roller; and

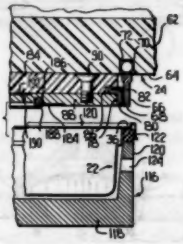
(d) a flexible tape guide for directing tape from said supply structure to said tape laying head.

4,707,213

INDUCTION HEATING UNIT FOR HEAT BONDING A LID HAVING A METALLIC LAYER TO A CONTAINER

Glenn R. Mohr, Linthicum, Md., and Donald J. Roth, Westport, Conn., assignors to Continental Can Company, Inc., Norwalk, Conn.

Filed Nov. 12, 1985, Ser. No. 796,776
Int. Cl.[4] B32B *31/26*
U.S. Cl. 156—380.2 **15 Claims**



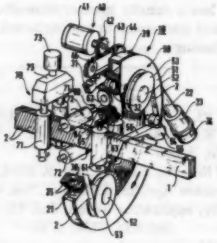
1. An induction heating unit for heat bonding a lid or the like having a metallic layer to a container or the like wherein a resultant line of heat bond includes at least one corner, said unit comprising an induction coil having a loop configuration in accordance with the outline of said resultant line of heat bond and including at least one corner, said induction coil having a lid engaging face, a ferrite current concentrator positioned alongside said induction coil for concentrating induced current in a lid or the like metallic layer to substantially the outline of said induction coil, and a ferrite current concentrator unit at said one corner.

4,707,214

TAPING MACHINE FOR HOT TAPING AN ELECTRICAL CONDUCTOR

Henri Nithart, Belfort, and Robert Graftiaux, 8 rue de l'Eglantine, 69500 Bron, both of France, assignors to Alsthom and R. Graftaiux, both of, France

Filed Nov. 13, 1986, Ser. No. 929,704
Claims priority, application France, Nov. 14, 1985, 85 16844
Int. Cl.[4] B65H *81/00*
U.S. Cl. 156—392 **5 Claims**



1. A taping machine for hot taping an electrical conductor to be insulated, said machine comprising; a relatively fixed outer

ring said conductor passing through the center of said fixed outer ring, a rotating ring mounted for rotation inside said fixed ring and carrying at least one reel having pre-impregnated insulating tape wound thereon, means for moving the taping machine and the conductor relative to each other in translation, means for rotating said rotating ring simultaneously relative to the conductor to cause the, or each, tape to be helically wound around the conductor, said fixed ring including a peripheral channel which is fed with hot air, and said rotating ring being provided with a rotating assembly including a plate for closing said peripheral channel, at least one spout carried by said rotating ring and rotating around said peripheral channel, and at least one associated heating nozzle communicating with said channel and being fed with hot air via said spout, and each heating nozzle having a transfer passage with each tape running along a transfer passage of a corresponding heating nozzle.

4,707,215

SHEET BINDING CARTRIDGE

Richard F. Scarlata, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 4, 1985, Ser. No. 794,887
Int. Cl.[4] B65C *11/04;* **B05C** *3/02;* **B42C** *9/00;* **A01J** *21/00*
U.S. Cl. 156—578 **9 Claims**

1. An apparatus for adhesively binding together a plurality of sheets to form a bound booklet thereof, including:

means for receiving successive sheets;

an operator replaceable cartridge comprising a housing defining a chamber arranged to store a supply of adhesive therein and having an entrance port in communication with the chamber of the housing for receiving adhesive thereat, the housing including a plurality of gates and a plurality of ramps molded integrally into the chamber thereof, and an applicator blade mounted on the housing in communication with the chamber therein for receiving adhesive therefrom, the plurality of gates and the plurality of ramps distributing adhesive flowing from the entrance port onto the applicator blade; and

means for moving said cartridge so that a portion of the applicator blade contacts the marginal region of successive sheets in said receiving means to apply a strip of adhesive thereon.

4,707,216

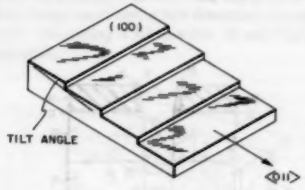
SEMICONDUCTOR DEPOSITION METHOD AND DEVICE

Hadis Morkoc, and Russ Fischer, both of Urbana, Ill., assignors to University of Illinois, Ill.

Filed Jan. 24, 1986, Ser. No. 822,343
Int. Cl.[4] C03B *23/00*
U.S. Cl. 156—610 **9 Claims**

1. A method of forming a layer of semiconductor material of improved quality, comprising the steps of:

providing a single crystalline silicon or germanium substrate having a {100} crystallographic surface tilted in the <001> direction; and



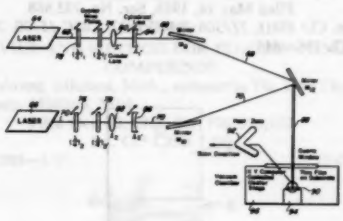
expitaxially depositing a different single crystalline semiconductor material over said surface to obtain a layer of said semiconductor material.

4,707,217

SINGLE CRYSTAL THIN FILMS

Monti E. Aklufi, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 28, 1986, Ser. No. 868,399
Int. Cl.[4] C30B *13/12*
U.S. Cl. 156—617 R **14 Claims**



1. A method of forming single crystal material from a material that has a crystalline state comprising the steps of:

(a) providing a layer of said material that has a polycrystalline state, said material that has a crystalline state having a preferred growth angle α which is defined by the intersection of the preferred growth planes of said material having a crystalline state;

(b) providing a shaped heat source that generates a shaped hot zone;

(c) scanning said heat source across a surface of said material that has a crystalline state so as to melt within said hot zone at least a portion of the surface of said material that has a crystalline state and such that said melted portion at the trailing edge of said hot zone has an included wedge angle θ, being less than α, and such that said melted portion solidifies into single crystal material.

4,707,218

LITHOGRAPHIC IMAGE SIZE REDUCTION

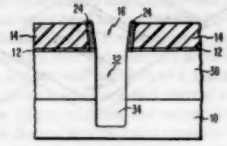
Nicholas J. Giammarco, Newburgh, N.Y.; Alexander Gimpelson, Allston, Mass.; George A. Kaplita, New Windsor, N.Y.; Alexander D. Lopata, Fishkill, N.Y.; Anthony F. Scaduto, Newburgh, N.Y., and Joseph F. Shepard, Hopewell Junction, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 28, 1986, Ser. No. 924,223
Int. Cl.[4] H01L *21/306;* **B44C** *1/22;* **C03C** *15/00, 25/06*
U.S. Cl. 156—643 **20 Claims**

1. Process for forming a mask having an opening of a size smaller than obtainable by lithography, comprising:

providing a substrate coated with a photosensitive material;

patterning the photosensitive material to form an opening therein, said opening having substantially vertical walls and minimum size dictated by resolution limit of lithography;



forming a conformal layer of a material on the resulting structure including said vertical walls; and

anisotropically etching said conformal layer to provide said conformal layer material on said vertical walls whereby said size of said opening is reduced.

4,707,219

INTEGRATED DEVICES INCLUDING CLEAVED SEMICONDUCTOR LASERS

Chung Y. Chen, New Providence, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed May 14, 1985, Ser. No. 733,868

Int. Cl.[4] H01L *21/306;* **B44C** *1/22;* **C03C** *15/00, 25/06*

U.S. Cl. 156—644 **2 Claims**

1. A process for fabricating a semiconductor device comprising semiconductor laser on a semiconductor substrate in which prior to cleaving the semiconductor substrate to form a facet of the semiconductor laser a hole is made in the substrate along the cleave plane so as to produce a stop cleave facet.

4,707,220

THIN-FILM EVAPORATORS

Vaclav Feres, Haid-und Neu-Str. 14, D-7500 Karlsruhe 1, Fed. Rep. of Germany

Continuation of Ser. No. 688,411, Jan. 2, 1985, abandoned. This application Mar. 14, 1986, Ser. No. 840,531

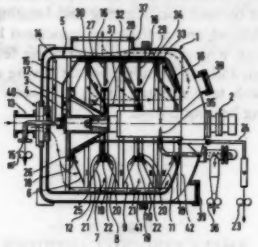
Claims priority, application Fed. Rep. of Germany, Jan. 14, 1984, 3401121

Int. Cl.[4] B01D *1/22*

U.S. Cl. 159—6.1 **11 Claims**

1. In a thin-film evaporator having: an enclosure defining a vapor space, a central driving shaft projecting into the enclosure, a rotor attached to the driving shaft within said enclosure, said rotor being formed with axially spaced conical evaporator elements coaxial to said driving shaft and defining an evaporation space that is connected with the vapor space, at least some of the axially adjacent conical evaporator elements forming the rotor being mounted in pairs so that the conical elements thereof taper away from each other toward opposite axial ends of the rotor and have the bases of the conical elements joined at their outer edges with adjacent elements and partitions to form take-up troughs, the conical elements being surrounded externally by a cylindrical heating space separated from the vapor space, scoop tubes leading from the take-up troughs of evaporating stages formed by some of the conical elements to subsequent evaporating stages for discharge as a final concentrate at one end of the rotor, and means for supplying a feed to the opposite end of the rotor at the inner edge of at least one conical evaporator element of a first evaporating stage to spread the feed outwards as a film and to reach a take-up trough at the outer edge of said element as a preconcentrate to be taken up by way of one of the scoop tubes, the improvement wherein:

said rotor mounted on the central driving shaft has an axis of



rotation disposed horizontally when the evaporator is in an operative position; and

an intake end of at least one of the scoop tubes is mounted in a take-up trough in the vicinity of the top or apex of the rotor in the operative position of the evaporator, and each tube with the intake so mounted extends transversely through the evaporating space and downwardly to the inner edge of a neighboring evaporator element to convey the preconcentrate between evaporating stages by gravity without the use of an external pump.

4,707,221

SHEETS HAVING IMPROVED STIFFNESS FROM FIBER, LATEX AND COALESCING AGENT

James J. Beer, and Do I. Lee, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 452,582, Dec. 23, 1982, abandoned. This application Mar. 26, 1984, Ser. No. 592,507

Int. Cl.[4] D21H *3/02, 3/32*

U.S. Cl. 162—158 **4 Claims**

1. A process for preparing printing paper having improved stiffness which comprises: (a) mixing in an aqueous medium a mixture comprising:

(i) a fiber,

(ii) a latex having minimum film forming conditions greater than the conditions the sheet reaches during drying,

(iii) a fugitive coalescing agent, and

(iv) a filler or pigment from about 25 to about 45 weight percent based on the weight of said printing paper;

(b) forming said mixture into a sheet; and (c) drying said sheet under conditions less than the minimum film forming conditions required by said latex.

4,707,222

START-UP AND OPERATING PROCEDURE FOR ROLL PRESS HAVING AN EXTENDED NIP PRESS WITH INFLATABLE PRESS JACKET

Josef Müllner; Christian Schiel, both of Heidenheim, and Karl Steiner, Herbrechtingen, all of Fed. Rep. of Germany, assignors to J. M. Voith GmbH, Fed. Rep. of Germany

Filed Mar. 28, 1985, Ser. No. 716,836

Claims priority, application Fed. Rep. of Germany, Feb. 1, 1985, 3503373

Int. Cl.[4] D21F *3/08*

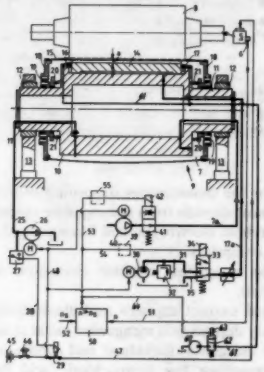
U.S. Cl. 162—205 **3 Claims**

1. A method of starting and maintaining the operation of a

roll press of an extended nip press, wherein the roll press includes a stationary support member, a press shoe which is supported in a fluid pressure chamber which is pressurized with liquid to urge the press shoe toward a cooperating counter-roll and a tubular, sealed, inflatable press jacket which rotates over the stationary support member and the press shoe and which rotates along with the counter-roll that is opposed to the press shoe, the method comprising:

(a) feeding compressed air into the interior space surrounded by the press jacket for inflating the press jacket to partially wrap around the counter-roll at least during the starting of the drive and rotation of the counter-roll;

(b) rotating the counter-roll to rotate the press jacket which is partially wrapped around the counter-roll;



(c) withholding the feed of pressurized liquid to the pressure chamber behind the press shoe so that the press shoe does not press the press jacket toward the counter-roll until a minimum speed of rotation of the counter-roll has been exceeded;

(d) thereafter feeding pressurizing liquid to the pressure chamber behind the press shoe once the minimum speed of rotation of the counter-roll has been exceeded; and

(e) reducing the feed of compressed air into the interior space with the commencement of feeding of the pressure liquid to the pressure chamber behind the press shoe; and

(f) maintaining operation of said roll press with said reduced feed of compressed air into the interior space.

4,707,223

APPARATUS FOR MEASURING THE STATE OF FORMATION OF A SHEET OF PAPER

Jacques Sabater, Gif/Yvette, and Serge Bauduin, La Tronche, both of France, assignors to Centre Technique de l'Industrie des Papiers Cartons et Celluloses, France

Filed Jul. 12, 1985, Ser. No. 754,162

Claims priority, application France, Jul. 17, 1984, 84 11493

Int. Cl.[4] D21F *7/00, 7/06*

U.S. Cl. 162—262 **4 Claims**

1. An apparatus for determining a state of formation of paper linearly moving in a plane, comprising:

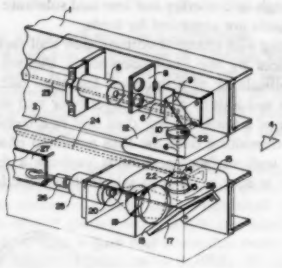
light source means, located on a first side of said plane, for transmitting a laser beam through said plane, said laser beam being polarized in a first direction;

polarizing means for polarizing said laser beam after said laser beam is transmitted through said plane, said polarizing means being located wherein the direction of polarization of said polarizing means is substantially perpendicular to said first direction, and wherein light passing through said plane due to voids in said moving paper is eliminated;

light sensing means for receiving said laser beam after said laser beam passes through said polarizing means, and for converting said laser beam into an electrical signal;

means for separating said electrical signal into a high frequency component and a low frequency component;

means for calculating a RMS value of said high frequency component;



means for calculating a mean value of said low frequency component; and

means for dividing said RMS value by said mean value to determine a state of formation of paper.

4,707,224

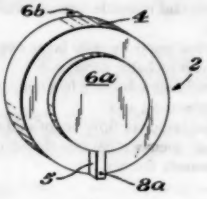
DEVICE AND METHOD FOR FLUORINATING COMPOUNDS

Mani Shabrang, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Oct. 30, 1986, Ser. No. 924,952

Int. Cl.[4] C25B *1/00*

U.S. Cl. 204—1 T **12 Claims**



1. A method for fluorinating compounds, comprising

(a) introducing fluorine to an input side of an electrochemically actuated fluoride-ion valve,

(b) electrochemically regulating the flow of fluorine through said fluoride-ion valve to an output side of said valve by means of an external voltage, wherein said output side is in contact with a compound to be fluorinated, and

(c) fluorinating said compound at said output side of said valve.

4,707,225

FLUID-COOLED CHANNEL CONSTRUCTION

Frederick T. Schuler, Chatsworth, and Randolph Flores, Simi Valley, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Jan. 6, 1986, Ser. No. 816,473

Int. Cl.[4] C25D *1/02*

U.S. Cl. 204—9 **10 Claims**

1. A method of forming corrosion-resistant cooling channels in a wall member for the flow of a corrosive cooling medium therethrough comprising the sequential steps of:

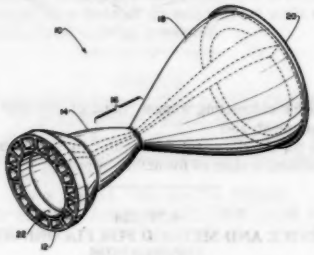
coating the outer surface of a wall member with a first metallic layer to form a wall substrate having a metallic coating overlay;

machining said first metallic layer to a predetermined thickness;

forming open channels having bottom and side wall surfaces through said overlay and into said substrate such that said channels are separated by lands;

activating said channels bottom, side wall surfaces and land surfaces by the electrodeposition thereon of a second metallic layer of a thickness less than said first metallic layer and a third metallic layer over said second metallic layer of a thickness less than said first metallic layer;

electrodepositing onto the thus activated channels bottom, side wall surfaces and lands surfaces a fourth metallic layer at least as thick as said first metallic layer;



filling said open channels with a meltable substance having a melting temperature less than that of said substrate and said metallic layers;

removing from said lands surface area said second, third and fourth metallic layers to expose said first metallic layer;

burnishing into said meltable substance a conductive metallic material;

depositing a final outer metallic layer over said coated substrate and said meltable substance;

heating said meltable substance to a temperature sufficient to melt said substance; and

causing said substance to flow out of said channels leaving a finished wall member having closed corrosion-resistant cooling channels therein.

4,707,226

PROCESS FOR THE DEHALOGENATION OF CHLOROACETIC AND BROMOACETIC ACID

Steffen Dapperheld, Kriftel, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Mar. 5, 1987, Ser. No. 21,991

Claims priority, application Fed. Rep. of Germany, Mar. 7, 1986, 3607446

Int. Cl.[4] C25B *3/06*

U.S. Cl. 204—81 **6 Claims**

1. A process for the dehalogenation of chloroacetic and bromoacetic acids by electrolysis of aqueous solutions of these acids using carbon cathodes and anodes likewise of carbon or of other conventional electrode materials in undivided or in divided (electrolysis) cells, wherein the aqueous electrolysis solutions in the undivided cells and in the cathode area of the divided cells contain, dissolved, one or more salts of metals having a hydrogen excess voltage of at least 0.4 V (at a current density of 4,000 A/m^2).

4,707,227

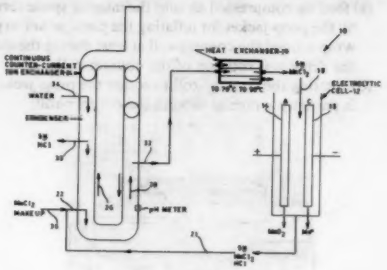
SIMULTANEOUS ELECTRO-DEPOSITION OF MANGANESE AND MANGANESE DIOXIDE

Irwin R. Higgins, 113 Clarion Rd., Oak Ridge, Tenn. 37830

Filed Sep. 15, 1986, Ser. No. 907,509

Int. Cl.[4] C25C *1/00*

U.S. Cl. 204—96 **21 Claims**



1. A process for the simultaneous deposition of manganese metal and manganese dioxide from a manganese chloride electrolyte in an undivided electrolytic cell having a cathode and an anode, which comprises:

introducing said manganese chloride electrolyte into said electrolytic cell;

passing electrical current through said electrolytic cell to simultaneously deposit said manganese metal at said cathode and said manganese dioxide at said anode; and

continuously removing free hydrochloric acid from said manganese chloride electrolyte to maintain said electrolyte at less than 0.1M free hydrochloric acid.

4,707,228

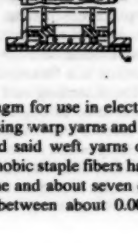
DIAPHRAGM FOR ELECTROLYTIC AND ELECTROCHEMICAL CELLS

Irving L. Rubak, Hamden, Conn., assignor to Treadwell Corporation, Thomaston, Conn.

Filed Jun. 6, 1986, Ser. No. 871,536

Int. Cl.[4] C25B *1/00*

U.S. Cl. 204—128 **21 Claims**



1. A woven diaphragm for use in electrolytic or in electrochemical cells comprising warp yarns and weft yarns, wherein:

said warp yarns and said weft yarns consist essentially of synthetic hydrophobic staple fibers having a linear density between about one and about seven denier;

said diaphragm is between about 0.005 and 0.150 inches

thick and has a density between about 0.1 and 3.0 pounds per square yard; and

said diaphragm is capable of providing separation of gases generated in the operation of the cell without impeding ionic and hydraulic flow rates and a cross cell voltage differential less than about 3.5 volts in the operation of the cell.

4,707,229

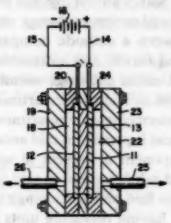
METHOD FOR EVOLUTION OF OXYGEN WITH TERNARY ELECTROCATALYSTS CONTAINING VALVE METALS

Russell M. Dempsey, Hamilton; Anthony R. Fragala, North Andover; Anthony B. LaConti, Lynnfield, and John F. Enos, Peabody, all of Mass., assignors to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 368,254, Jun. 28, 1982, Pat. No. 4,457,824, which is a continuation-in-part of Ser. No. 307,456, Oct. 1, 1981, abandoned, which is a division of Ser. No. 142,589, Apr. 21, 1980, Pat. No. 4,311,569. This application Dec. 22, 1983, Ser. No. 564,523

Int. Cl.[4] C25B *1/02*

U.S. Cl. 204—129 **5 Claims**



1. In a process for generating oxygen by electrolyzing a medium including an oxygen containing compound in a cell having a separator capable of ion transport and having oppositely charged electroconductive anode and cathode electrodes, the oxygen-evolving anode electrode having a catalytic element comprising a ternary catalyst of a first platinum group metal compound, a second platinum group metal compound and a valve metal containing compound wherein said valve metal containing compound comprises about ½ to about 50 percent by weight, the first platinum group metal compound comprises about 5 percent to about 25 percent by weight and the second platinum group metal compound comprises the remainder of said ternary catalyst wherein the electrolysis at the anode electrode for the evolutions of oxygen is carried out in an acidic medium.

4,707,230

ELECTROCHEMICAL DEHALOGENATION OF ORGANIC COMPOUNDS

Alfred M. Ajami, Brookline, Mass., assignor to Tracer Technologies, Inc., Newton, Mass.

Filed Sep. 23, 1985, Ser. No. 779,336

Int. Cl.[4] C25B *3/00*; B01D *57/02*

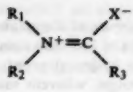
U.S. Cl. 204—131 **29 Claims**

1. A process for dehalogenating a halogenated organic compound comprising:

(1) combining in an electrochemical cell

(a)(1) a halogenated organic compound or (ii) a solid or liquid containing a halogenated organic compound, with

(b) a compound capable of forming an iminium ion having the formula (I)



(I)

where

X represents an oxygen atom or a sulfur atom,

R_1 and R_2, which may be the same or different, each represents an alkyl group, an aryl group or a heterocyclic group wherein when X is an oxygen atom, R_1 and R_2 are not simultaneously a methyl group, and R_1 and R_2 may combine and form a carbocyclic ring or a heterocyclic ring, and

R_3 represents a hydrogen atom, an alkyl group, an aryl group, a heterocyclic group or a halogen atom, and

(2) applying an electrical voltage and an electrical current to an electrode of said electrochemical cell as a working electrode; which voltage is such that a reaction occurs and the halogenated organic compound is partially or completely dehalogenated due to said reaction and the interaction of said iminium ion forming compound with said halogenated compound.

4,707,231

PROCESS FOR PREPARING COMPOSITE MATERIALS AND PRODUCTS OBTAINED WITH SAID PROCESS

Michel Berger, Sainte Helene, France, assignor to Pradom Limited, London, England

Filed Sep. 19, 1985, Ser. No. 777,622

Claims priority, application France, Sep. 26, 1984, 84 14800

Int. Cl.[4] C07G *13/00*

U.S. Cl. 204—164 **6 Claims**

1. Process for the preparation of a composite material that includes fibers used to reinforce the composite material comprising the steps of:

subjecting the fibers to an electrostatic field induced by a high-voltage alternating electric current for a time interval sufficient to cause a modification of the surface of said fibers; and

impregnating said fibers after the elapse of said time interval with a liquid matrix material or precursor of matrix, while still under the influence of said field, thereby consolidating bonding between the fibers and the matrix.

4,707,232

ALCOHOL-MODIFIED POLYEPOXIDES, THEIR PREPARATION AND THEIR USE IN CURABLE MIXTURES

Wolfgang Batzill; Arnold Dobbelstein; Michael Geist, all of Münster; Georg Schön, Everswinkel, and Günther Ott, Münster-Wolbeck, all of Fed. Rep. of Germany, assignors to BASF Farben & Fasern AG, Münster-Hiltrup, Fed. Rep. of Germany

Division of Ser. No. 711,997, Mar. 14, 1985, Pat. No. 4,661,541. This application Nov. 21, 1986, Ser. No. 933,629

Claims priority, application Fed. Rep. of Germany, Mar. 14, 1984, 34091882

Int. Cl.[4] C25D *13/00*

U.S. Cl. 204—181.7 **4 Claims**

1. A process for electrophoretically coating an electrically conductive substrate, connected as the cathode, from an aqueous bath based on a cationic binder at least partially neutralized with acids, the binder being self-crosslinkable or being crosslinkable due to the presence in said bath of a crosslinking agent,

wherein the binder is comprised of a synthetic resin prepared by reacting:

A. a diepoxide, or a mixture of diepoxides, having an epoxide equivalent weight of less than about 500, with

B. a compound with a hydroxyl group, which is reactive towards epoxide groups, wherein said hydroxyl group containing compound and said diepoxide are in a molar ratio of about 2:1 to about 7:6 and are reacted at temperatures from about 100° C. to about 180° C. in an organic solvent free of hydroxyl groups, said synthetic resin having terminal epoxide groups and a mean molecular weight from about 400 to about 5000.

4,707,233

DEVICE FOR EXTRACTION OF ELECTROPHORETIC FRACTIONS

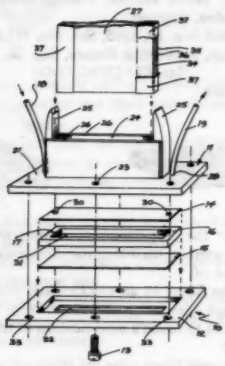
Joel Margolis, Greenwich, Australia, assignor to Gradiant Pty Limited, Greenwich, Australia

Filed Apr. 28, 1986, Ser. No. 856,786

Claims priority, application Australia, Apr. 29, 1985, PH0347

Int. Cl.[4] G01N *27/28*

U.S. Cl. 204—182.3 **10 Claims**



1. In an electroelution device used in the preparative scale recovery of macromolecules from an electrophoretic gel and installed between the electrodes of an electrophoretic cell, the improvement comprising said device comprising a gel receiving receptacle, an aperture in the base of the receptacle, a first membrane substantially permeable to the macromolecules desired to be recovered covering the aperture, a second membrane, substantially impermeable to the macromolecules to be recovered but permeable to electrolyte molecules in a buffer solution used in electrophoresis, lying in spaced apart array with the first membrane to define therebetween a recovery space, and means to allow the periodic or continuous withdrawal of buffer solution and macromolecules from the recovery space.

8. A method for the preparative scale recovery of macromolecules from an electrophoretic gel comprising placing an electrophoretic gel containing macromolecules to be recovered into the gel receiving receptacle of an electroelution device according to claim 1, applying an electric potential across the device to cause the macromolecules to migrate through the first membrane into the recovery space, and recovering the macromolecules from the recovery space of the said device.

4,707,234

METHOD FOR SEPARATING AN ACID AND AN ALKALI FROM AN AQUEOUS SOLUTION OF A SALT

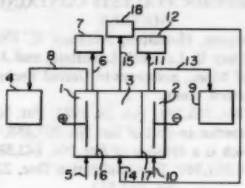
Takashi Mori; Kenichi Fukuda, and Yasuhiro Kurauchi, all of Shin-nanyo, Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Shin-nanyo, Japan

Filed Oct. 24, 1986, Ser. No. 922,727

Claims priority, application Japan, Oct. 25, 1985, 60-237655; Oct. 25, 1985, 60-237656; Oct. 25, 1985, 60-237657; Aug. 14, 1986, 61-189537

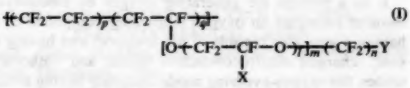
Int. Cl.[4] C25D *13/00*

U.S. Cl. 204—182.3 **10 Claims**



1. A method for separating acid and alkaline components fron an aqueous salt solution by ion exchange electrolysis wherein a fluorinated cation exchange membrane is utilized as a diaphragm between a cathode compartment, wherein said alkaline compound forms, and an intermediate compartment, and a fluorinated anion exchange membrane is utilized as a diaphragm between an anode compartment, in which said acid forms, and said intermediate compartment,

such that said acid is present in said anode compartment, said alkaline component is present in said cathode compartment and said salt is present in said intermediate compartment, wherein said anion exchange membrane is made of a copolymer having repeating units of the formula:



(I)

wherein X is F or CF_3, l is an integer of from 0 to 5, m is 0 or 1, n is an integer of 1 to 5, each p and q is a positive number and the ratio of p/q is from 2 to 16, and Y is a group involving a quaternary ammonium group.

4,707,235

ELECTROPHORESIS METHOD AND APPARATUS HAVING CONTINUOUS DETECTION MEANS

David F. Englert, Plainfield, and Richard J. Wheeler, Warren, both of N.J., assignors to Pharmacia, Inc., Piscataway, N.J.

Filed Oct. 16, 1985, Ser. No. 787,904

Int. Cl.[4] C25B *7/00*

U.S. Cl. 204—182.8 **25 Claims**

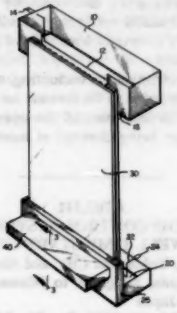
12. A method of continuously analytically observing the separation of samples into a plurality of components by electrophoresis simultaneously for a plurality of samples which comprises:

introducing samples containing multiple components into separate channels in an electrophoresis medium;

subjecting said samples to an electric potential in said channels of said electrophoresis medium to cause components of each sample to migrate along said channel; and

continuously in time detecting said components in each sample simultaneously during the electrophoretic migration, at a location separated from the position of sample

introduction with a detector disposed in a fixed position substantially across the width of said medium, as said



components pass through said medium in their respective channels.

4,707,236

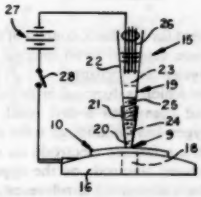
METHOD OF FARBRICATING AN OPTICALLY GRADED LIGHT OCCLUDING GEL

Richard Borowsky, 17 Amherst Ct., Rockville Center, N.Y. 11570

Continuation-in-part of Ser. No. 637,597, Aug. 3, 1984, Pat. No. 4,576,453. This application Mar. 17, 1986, Ser. No. 840,345

Int. Cl.[4] G02C *7/10;* **B01D** *57/02;* **B05D** *5/06*

U.S. Cl. 204—182.8 **24 Claims**



1. A method of progressively grading an optical area in a hydrogel matrix by electrophoretic introduction of a charged dye into said hydrogel matrix, comprising the steps of:

(a) contacting a hydrogel matrix with a medium containing an ionized coloring agent, dye, or dye precursor; and

(b) applying an electrical potential across said hydrogel matrix and said medium for a given period of time, causing said dye to electrophoretically migrate from said medium through said hydrogel matrix, whereby a progessively optically graded area is formed across said hydrogel matrix.

4,707,237

SYSTEM FOR IDENTIFICATION OF CELLS BY ELECTROPHORESIS

Cyrus A. Lepp, Stoughton, Mass.; James J. Mussatto, Fairfax Station, Va., and James M. Ziegenmeyer, Lexington, Mass., assignors to Ciba Corning Diagnostics Corp., Medford, Mass.

Filed Sep. 9, 1982, Ser. No. 416,461

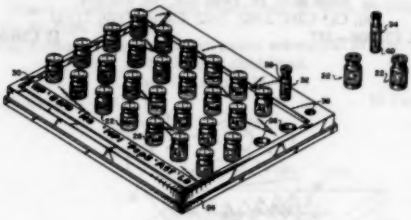
Int. Cl.[4] G01N *27/26*

U.S. Cl. 204—182.8 **38 Claims**

1. An electrophoretic method for identifying cells comprising the steps of:

(a) simultaneously performing on an electrophoretic film, multiple electrophoretic separations on a sample from a control, a standard population of cells, and at least one sample from an unknown population of cells each of the samples containing a least some electrophoretically separable substances which are characteristic of all the cells;

(b) developing the electrophoretic separations of control, standard, and unknown cells with regard to an electrophoretically separable, characteristic substance;



(c) comparing the developed separations for the control and standard samples to determine the range of separation for the characteristic substance under the conditions used; and

(d) based on the range of separation so determined, comparing the separations for the unknown and standard samples to identify the unknown cells.

4,707,238

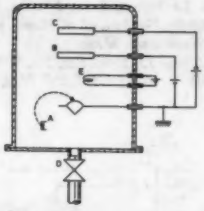
METHOD OF PROCESSING A METAL SURFACE

Tadanobu Okubo, No. 400-240, Kamiza, Sakura-shi, Chiba-ken, Japan

Filed May 15, 1986, Ser. No. 863,682

Int. Cl.[4] C23C *14/00*

U.S. Cl. 204—192.31 **4 Claims**



1. A method of processing a metal article, comprising the steps of:

subjecting a metal article having a metal surface to bombardment treatment in the presence of an inert gas;

ion-plating onto said metal surface a first layer of a metal compound selected from group consisting of chromium nitride, titanium nitride and titanium carbide, said metal compound being ion-plated in the presence of an active gas;

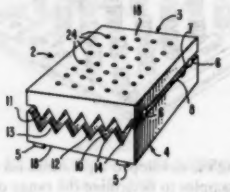
ion-plating an elemental metal or an alloy of said elemental metal onto said metal material having said first layer, to form a second layer of said elemental metal or said alloy thereof, said elemental metal being ion-plated by an arc discharge in the absence of inert gas.

4,707,239

ELECTRODE ASSEMBLY FOR MOLTEN METAL PRODUCTION FROM MOLTEN ELECTROLYTES

James E. Murphy, Verdi, and Michael F. Chambers, Reno, both of Nev., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Mar. 11, 1986, Ser. No. 838,491
Int. Cl.[4] C25C 3/02, 7/02; C25B 11/12, 11/03
U.S. Cl. 204—247 15 Claims



1. An electrode assembly for use in an electrolytic cell for producing metal comprising:

(a) at least an anode electrode and a cathode electrode, arranged in spaced relationship to define an inter-electrode space between said anode and cathode electrodes;

(i) each said anode and cathode electrode being formed with at least one surface having a pattern comprising a series of rows of alternating peaks and valleys; and

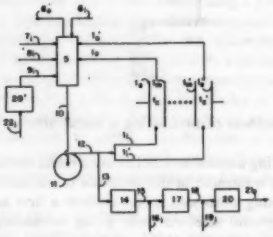
(b) means for assembling said anode and cathode electrodes so that the sides of the peaks on one of said anode or cathode electrode surfaces extend into the sides of the valleys on the other electrode surface in parallel spaced relationship wherein said anode electrode is provided with a plurality of spaced gas evacuation apertures extending therethrough, said apertures being positioned in said valleys whereby gas produced during electrolysis may enter the apertures and flow out of said inter-electrode space.

4,707,240

METHOD AND APPARATUS FOR IMPROVING THE LIFE OF AN ELECTRODE

Edgardo J. Parsi, Lexington; Keith J. Sims, Framingham, and Arthur L. Goldstein, Weston, all of Mass., assignors to Ionics Incorporated, Watertown, Mass.

Filed Sep. 15, 1986, Ser. No. 907,702
Int. Cl.[4] C25B 11/00, 11/04; C25C 7/02; C25D 17/10
U.S. Cl. 204—290 F 21 Claims



1. A method for extending the useful anode life of an electrode in an electrodialysis stack which electrode comprises at least in part an area which is anodic during at least part of the operating time of said stack, which stack also comprises an electrode compartment containing said electrode, a counter-electrode in a counter-electrode compartment and interior compartments between said electrode compartment and said counter-electrode compartment, which method comprises:

(a) introducing into said electrode compartment a solution capable of forming an electronically conducting layer which is substantially refractory anodically on said area which is anodic during at least part of the operating time of said stack, and

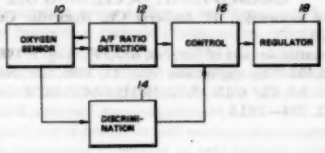
(b) causing an electronically conducting, substantially anodically-refractory layer to be formed on said area which is anodic during at least part of the operating time of said stack, said layer being derived at least in part from said solution.

4,707,241

AIR/FUEL RATIO CONTROL SYSTEM INCLUDING MEANS TO WELL TIME START OF FEEDBACK

Toyoaki Nakagawa, Yokohama City, and Shisei Kai, Yokosuka City, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama City, Japan

Filed Feb. 28, 1986, Ser. No. 835,031
Claims priority, application Japan, Mar. 7, 1985, 60-45965
Int. Cl.[4] G01N 27/46
U.S. Cl. 204—406 5 Claims



1. A control system for feedback control of the air/fuel ratio of an air-fuel mixture supplied to an internal combustion engine, the control system comprising:

an oxygen sensor which is disposed in an exhaust passage of the engine and comprises a first solid electrolyte cell having an oxygen ion conductive solid electrolyte layer provided with a reference electrode on one side thereof and a measurement electrode on the opposite side, reference means for maintaining a reference gas atmosphere containing a given amount of oxygen such that said reference electrode is exposed to said reference gas atmosphere, measurement means for defining a space which provides access to said measurement electrode for gases and restrictively admitting a fraction of the exhaust gas of the engine into said space and a second solid electrolyte cell having an oxygen ion conductive solid electrolyte layer provided with a pair of electrodes in such an arrangement that an externally supplied pumping current flows through the solid electrolyte layer to cause migration of oxygen ions therethrough and to thereby cause a change in the partial pressure of oxygen in said space;

sensor means to detect the temperature of the engine;

means for outputting a detection start signal after the lapse of a predetermined length of time from the start of the engine, said predetermined length of time being based upon the temperature of the engine, received from said sensor means, and decreasing as the detected temperature of the engine increases;

detection means for supplying said pumping current to said second solid electrolyte cell in said oxygen sensor while controlling said pumping current so as to render the output voltage of said first solid electrolyte cell equal to a target value and producing an air/fuel ratio signal which is representative of the magnitude of the controlled pumping current, said detection means comprising means for suspending the supply of said pumping current to said second solid electrolyte cell in said oxygen sensor until

receiving said detection start signal from said means for outputting a detection start signal; and

control means for producing and outputting an air/fuel mixing ratio control signal based on said air/fuel ratio signal, said control means comprising discrimination means for ascertaining whether or not said output voltage is within a predetermined tolerance range containing said target value and suspension means for suspending outputting said air/fuel mixing ratio control signal if said output voltage is outside said predetermined tolerance range.

4,707,242

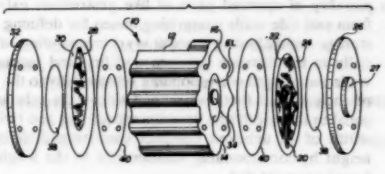
ELECTROCHEMICAL CELL FOR THE DETECTION OF NOXIOUS GASES

Alan A. Schneider, Reisterstown; David A. Stewart; Joseph D. Joison, both of Baltimore; RaeAnn M. Auel, Westminster, and John F. Price, Owings Mill, all of Md., assignors to Mine Safety Appliances Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 646,316, Aug. 30, 1984. This application Jul. 29, 1985, Ser. No. 760,144

Int. Cl.[4] G01N *27/46*

U.S. Cl. 204—412 **19 Claims**



1. An electrochemical cell for quantitatively detecting ethylene oxide comprising:

(a) a first working electrode comprising a gas diffusion membrane having bonded thereto a catalytic portion electrochemically reactive with ethylene oxide;

(b) a second working electrode having electrochemical activity with oxidation/reduction products produced at the first working electrode;

(c) a counter electrode;

(d) a reference electrode;

(e) an electrolyte in contact with the catalytic portion of the first working electrode and in contact with the second working, counter and reference electrodes;

(f) means for containing said electrolyte and said first and second working electrodes, said counter electrode and said reference electrode;

(g) means for maintaining a fixed potential on said first working electrode relative to said reference electrode of from above 1.0 to about 1.8 volts with respect to the potential of the reversible hydrogen couple in the electrolyte of the cell; and

(h) means for maintaining a fixed potential on said second working electrode relative to said reference electrode of from about 1.0 to 2.2 volts with respect to the potential of the reversible hydrogen couple in the electrolyte of the cell, the fixed potential on said second working electrode being maintained at a voltage higher than the fixed potential being maintained on said first working electrode.

4,707,243

ION SELECTIVE ELECTRODE

Osamu Seshimoto, and Mitsuharu Nirasawa, both of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

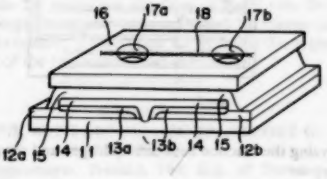
Continuation of Ser. No. 747,003, Jun. 19, 1985, abandoned. This application Apr. 11, 1986, Ser. No. 851,877

Claims priority, application Japan, Jun. 20, 1984, 59-128239; Jun. 20, 1984, 59-128240

The portion of the term of this patent subsequent to Mar. 25, 2003, has been disclaimed.

Int. Cl.[4] G01N *27/46*

U.S. Cl. 204—418 **10 Claims**



1. An integral ion selective electrode for analysis of a potassium ion comprising in the following order:

(I) a support;

(II) an electroconductive metal layer;

(III) a layer of a water-insoluble salt of said metal;

(IV) an electrolyte layer which comprises crystalline electrolyte salts of cations including a potassium ion and a sodium ion with the same anion as the anion of the water-insoluble salt, said electrolyte layer being substantially free from a binder, wherein the mean crystal size of the crystalline electrolyte salt is not more than 50 μm; and

(V) a potassium ion selective layer.

7. A process for the preparation of an integral ion selective electrode for analysis of a potassium ion comprising in the following order (I) a support, (II) an electroconductive metal layer, (III) a layer of a water-insoluble salt of said metal (IV) an electrolyte layer which comprises crystalline electrolyte salts of cations including a potassium ion and a sodium ion with the same anion as the anion of the water-insoluble salt, said electrolyte layer being substantially free from a binder, and (V) a potassium ion selective layer,

comprising forming the electrolyte layer by coating a solution of said electrolyte salts in a mixture of water and an organic solvent on the layer of a water-insoluble salt and drying the thus coated layer.

4,707,244

SOLID STATE SENSOR ELEMENT

John N. Harman, III, Placentia, and Radhakrishna M. Neti, Brea, both of Calif., assignors to Beckman Industrial Corporation, LaHabra, Calif.

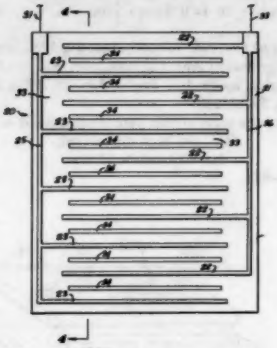
Filed Jan. 21, 1986, Ser. No. 819,936

Int. Cl.[4] G01N *27/46*

U.S. Cl. 204—430 **31 Claims**

1. A solid state moisture sensing element comprising a nonporous, structurally stable, inert electrically insulating substrate having at least a pair of electrodes disposed on a surface thereof for exposure to moisture, said electrodes being spaced apart to define an interelectrode gap therebetween, a hygroscopic electrolytic material bridging said electrodes, means electrically connecting said electrodes to a source of electrical potential and current measuring instrumentation, the improve-

ment comprising a catalyst material disposed in close proximity to said electrodes and electrically insulated therefrom for



catalyzing the reaction between hydrogen and oxygen to form water.

4,707,245

TEMPERATURE CONTROL FOR HYDROGENATION REACTIONS

Mario Baldasarri, Paramus; William R. Adams, Upper Montclair, and John Caspers, Basking Ridge, all of N.J., assignors to Lummus Crest, Inc., Bloomfield, N.J.

Filed Dec. 20, 1985, Ser. No. 811,488
Int. Cl.[4] C10G *45/00, 65/02*
U.S. Cl. 208—57 **15 Claims**

1. A process for hydrogenating a feed in a reactor, comprising:

heating at least one of a feed to the reactor or a gas containing hydrogen in a fuel fired furnace prior to introduction into the reactor; sensing the temperature at different height levels in the reactor; and controlling the flow rate of fuel to the fuel fired furnace in response to an average temperature in the reactor as determined from the temperatures sensed at different levels in the reactor to maintain a pre-set temperature in the reactor.

4,707,246

HYDROTREATING CATALYST AND PROCESS

Lloyd E. Gardner, and Stephen L. Parrott, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 14, 1986, Ser. No. 930,637
Int. Cl.[4] C10G *45/00*
U.S. Cl. 208—251 H **13 Claims**

1. A process for hydrotreating a substantially liquid hydrocarbon-containing feed stream, which also contains compounds of nickel, vanadium and sulfur, comprising the steps of contacting said hydrocarbon-containing feed stream with hydrogen in the presence of a catalyst composition comprising

(a) alumina,

(b) zinc titanate,

(c) at least one compound of molybdenum,

(d) at least one compound of nickel, and

(e) at least one compound containing phosphorus and oxygen,

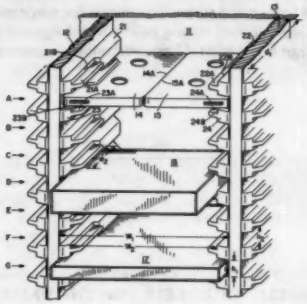
under such hydrotreating conditions as to obtain a hydrocarbon-containing product stream having reduced levels of nickel vanadium and sulfur.

4,707,247

DISK CASSETTE STORING

Robert L. Savoy, Arlington, Mass., assignor to Savoy Leather Manufacturing Corporation, Haverhill, Mass.

Filed Apr. 3, 1987, Ser. No. 34,402
Int. Cl.[4] B65D *85/672*
U.S. Cl. 206—387 **4 Claims**



1. Apparatus for storing compact disks and compact cassettes in each of a plurality of storage compartments comprising,

a rear wall,

at least first and second parallel side walls cantilevered from said rear wall each having a free edge and comprising means for defining therebetween a column of storage compartments,

a plurality of opposed pairs of like protrusions extending from said side walls comprising means for defining a first storage region having a width w_1 corresponding substantially to the distance between said first and second side walls and a depth corresponding substantially to the width of each of said first and second side walls substantially equal to the width of a boxed compact disk and twice the width of an unboxed compact cassette and defining a height h_2 corresponding substantially to the height of a boxed compact disk,

the width of each side panel being slightly less than the width of a boxed compact disk,

said protrusions having means for defining a second region of width w_2 corresponding substantially to the length of a boxed compact cassette and a depth d_2 less than the width of a boxed compact cassette with said second storage region being spaced from said rear wall so that a boxed compact cassette stored in said second region protrudes outside the free edges of said side walls.

4,707,248

PROCESS FOR THE RETORTING OF HYDROCARBON-CONTAINING SOLIDS

Julio C. Silva; Ubirajara Gaiao, and Rubens E. Novicki, all of Parana, Brazil, assignors to Petroleo Brasileiro S.A., Rio De Janeiro, Brazil

Filed Oct. 19, 1984, Ser. No. 662,739
Claims priority, application Brazil, May 27, 1983, 8302810
Int. Cl.[4] C10G *1/02*; C10B *53/06*
U.S. Cl. 208—409 **4 Claims**

1. A process for the retorting of hydrocarbon-containing solids, characterized in that it comprises the following steps:

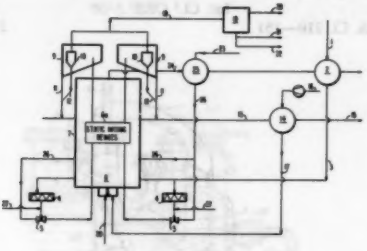
(a) contacting the solid particles with superheated steam;

(b) transporting, in an upward direction, the mixture obtained in the previous step, at a gas velocity close to the critical impact velocity, through a vertical multi-tube reactor, immersed in a vertical furnace, held at a temperature in the range from 800° to 1000° C.;

(c) heating said obtained mixture to the solids' pyrolysis

temperature, by means of the heat generated by the burning of fuel inside the vertical furnace and supplied to said mixture through the walls of said reactor;

(d) removing the products from the reactor, separating the solid phase from the retorting products, by forcing said products to pass through primary and secondary separators, holding the temperature at a high level, above the dew point of the vapors;



(e) removing the gaseous phase from the retorting products exiting the secondary separator thus effecting a second separation stage, for the obtaining of fuel gas and oil said process further characterized in that spaced static devices are provided within the multi-tube reactor tube, so as to cause the solid particles to come close to the walls of said reactor, as a consequence of the superheated steam flow redistribution in order to increase heat transfer between said vertical furnace and said reactor walls.

4,707,249

SAND CLASSIFICATION TANK

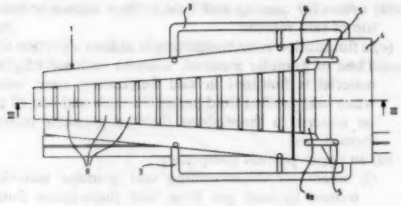
Ivar Apeland, N-4137 Årdal, Norway

Filed Feb. 28, 1985, Ser. No. 706,724

Claims priority, application Norway, Mar. 13, 1984, 840942

Int. Cl.[4] B03B *5/62*; B07C *5/14*

U.S. Cl. 209—156 **5 Claims**



1. A sand classification tank for producing classified sand, i.e., sand containing predetermined fractions of sand grains of different sizes per unit of volume, comprising:

(a) an elongated tank having end walls and a bottom wall partially filled with water;

(b) introduction means at a first end wall for introducing a mixture of raw unclassified sand and water at a predetermined rate beneath the surface of the water in the partially filled tank thereby defining a sand flow direction toward a second end wall and depositing the grains of sand as a sediment at the bottom of the tank at varying distances from the introduction means, depending on the weight of the grains, such that the coarsest sand fraction will settle closest to the place of introduction while the finest fraction will be deposited farthest away from the introduction means;

(c) the classification tank further comprising bottom means defining a plurality of successive compartments said, bottom means being connected to said bottom wall and located so as to receive different grain sizes of sand;

(d) each compartment communicating with at least one screw conveyor means for carrying off the deposited sand, said compartments further communicating with the remainder of the tank through a plurality of slots;

(e) one of said compartments being the farthest from the introduction means adapted to receive the finest fraction;

(f) immediately upstream of the farthest compartment a baffle means is adjustably mounted transverse to the longitudinal direction of the tank and the direction of flow of the sand, said baffle means facilitating the precipitation of the finest fraction in said farthest compartment;

(g) said baffle means being formed by two parallel plates having perforations at the upper portion thereof, providing means for permitting the flow of water into the farthest compartment and being regulated by movement of the plates relative to each other for adjusting the degree of overlap of the respective holes therein.

4,707,250

MACHINE WITH AUTOMATIC TRANSPORT OF ARTICLES

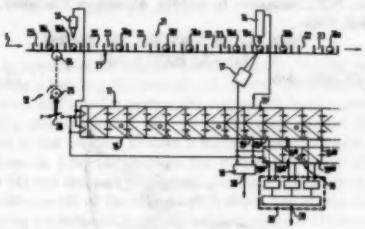
Heinrich Hippenmeyer, Freiamt, Fed. Rep. of Germany, assignor to Erwin Sick GmbH Optik-Elektronik, Waldkirch, Fed. Rep. of Germany

Filed Jun. 21, 1985, Ser. No. 747,287

Claims priority, application Fed. Rep. of Germany, Jun. 26, 1984, 3423538

Int. Cl.[4] B07C *5/342*

U.S. Cl. 209—548 **3 Claims**



1. An automatic article transport machine, in particular a packaging machine, wherein individual like compartments are moved on a conveyor along a conveyor path subdivided into unit lengths, which are each associated with one compartment, past various processing stations, a certain article being present in some compartments, said article having one of two characteristics, either a characteristic corresponding to a certain norm or a characteristic differing from the certain norm, whereas some other compartments are empty; said machine comprising: a clock associated with the conveyor which transmits a clock signal to a characteristic shift register associated with the conveyor path on advance of the conveyor by one unit length, and thereby shifts the information contained in the characteristic shift register on by one storage unit; a characteristic detection apparatus which is provided in the vicinity of the start of the conveyor path, said apparatus being connected to the input of the characteristic shift register and detects that one of said two characteristics of each article which the article moving past said apparatus possesses, and transmits a corresponding electrical characteristic signal which is input into the storage unit of the characteristic shift register being associated with said article; and an article sorting apparatus arranged at a downstream position of the conveyor path, the article sorting apparatus being connected to the characteristic shift register and, at the instant an article moves past, receives the associated characteristic signal from the associated storage unit of the

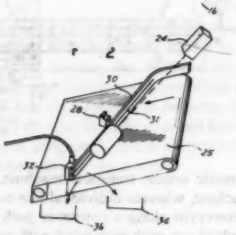
characteristic shift register and correspondingly sorts the relevant article; a presence shift register, controlled by the clock, being provided in parallel with the characteristic shift register and has one storage unit for each compartment; a presence signal being input into the associated storage unit of the presence shift register in the presence of an article moving past the characteristic detection apparatus whereas an absence signal is input into said storage unit if the compartment is empty; and an article presence detection apparatus arranged along the conveyor path at the location of the article sorting apparatus and connected to a logic circuit which transmits a fault signal when the determination made by the presence detection apparatus differs from the content of the associated storage unit of the presence shift register, the output signal of the presence detection apparatus being applied to the input of a comparison shift register which is shifted in synchronism with the conveyor; at least one of a plurality of storage units associated with one another, of the presence shift register and of the comparison shift register being applied to a comparison circuit which checks the contents of said at least one storage unit of the presence shift register and of the comparison shift register for coincidence and transmits an error signal if coincidence fails to be present.

4,707,251

CONTAINER SCANNING AND ACCOUNTING DEVICE

Jerry V. Jenkins; Haskell F. Sloan, both of Denver; Robert L. Frenkel, Englewood, all of Colo., and Albert Zielinski, Buffalo, N.Y., assignors to Golden Aluminum Company, Lakewood, Colo.

Filed Jun. 20, 1985, Ser. No. 746,866
Int. Cl.[4] B07C *5/344*
U.S. Cl. 209—569 **13 Claims**



1. An apparatus for scanning containers, said containers each having a code and each having a longitudinal axis, comprising:

(a) A conveyor for transporting said containers, said conveyor moving in a first direction at a predetermined speed;

(b) A guide diagonally mounted across the top of at least a portion of the conveyor at a predetermined angle relative to said first direction of said conveyor, wherein each of said containers contemporaneously moves along said guide and rotates about its own said longitudinal axis, and wherein said predetermined speed and said predetermined angle are established so that each container will complete at least one revolution within a predetermined distance along said guide; and

(c) scanner means for scanning said code on each of said containers, said scanner means having an orientation and a field of view wherein said predetermined distance along said guide is scannable by said scanning means.

4. The apparatus of claim 1 further comprising an ejector means for rejecting any containers that are not successfully scanned by at least one of the scanners.

4,707,252

FLUID BED REACTOR FOR THE BIOLOGICAL TREATMENT OF WATER

Jean Durot, Villepreux, and Claude Prevot, Ville d'Avray, both of France, assignors to Societe Degremont, Rueil Malmaison, France

Filed Aug. 1, 1986, Ser. No. 891,629
Claims priority, application France, Aug. 9, 1985, 85 12236; Jul. 1, 1986, 86 09523
Int. Cl.[4] C02F *3/08*
U.S. Cl. 210—151 **32 Claims**

1. A reactor for aerobically or non-aerobically treating a fluid, wherein said reactor comprises:

(a) a base comprising means for introducing said fluid into said reactor, and means for adding a gas to said fluid in said reactor thereby converting said fluid into a gasified fluid, wherein said fluid introduction means comprises at least one orifice through which said fluid passes, and at least one substantially horizontally extending plate comprising a supple membrane, wherein said plate and said membrane together comprise a valve;

(b) means for causing said fluid to flow from a bottom to a top of said reactor;

(c) a fluidization zone comprising in at least a portion thereof a bed of granular material, wherein said bed of granular material is fluidized in said fluidization zone, whereby when said gasified fluid passes through said bed of granular material a three-phase fluid-gas-granular mixture is formed; and

(d) an upper portion comprising:

(i) means for disembedding said granular material entrained by said gas from said three-phase fluid-gas-granular material mixture;

(ii) means for degasing said three-phase fluid-gas-granular material mixture;

(iii) means for separating said granular material from said fluid to produce a fluid discharge, wherein said separation means comprises means for recycling said granular material into said fluidization zone and means for decanting said fluid from said granular material; and

(iv) means for recycling and recuperating a portion of said fluid discharge into said fluidization zone thereby fluidizing said bed of granular material.

4,707,253

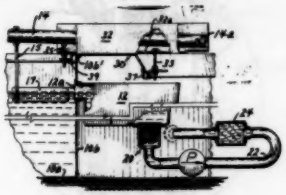
SWIMMING POOL SKIMMER ACCELERATOR

Ray Rowe, R. 4, Box 118, DeSoto, Mo. 63020

Filed Sep. 22, 1986, Ser. No. 910,014
Int. Cl.[4] E04H *3/20*
U.S. Cl. 210—169 **2 Claims**

1. A skimmer accelerator for a swimming pool having a side

wall, a water inlet introducing water into said pool in a preselected flow pattern, and a skimmer mounted on said side wall and communicating with said water comprising a vertically pivotal support member positioned on side wall proximate said skimmer and extending above said water, wherein said vertically pivotal support member is electively positionable by a bolted fastener means to secure said vertically pivotal support member at a preselected angular location in a horizontal plane for accommodating water speed, and a blade supported on and



below said vertically pivotal support member extending a preselected depth into said water and in a facing relationship with the oncoming flow of said water, wherein said blade is vertically adjustable independently of said vertically pivotal support member to any selected in-water depth, and wherein said vertically pivotal support member and said blade assume an acute angle with respect to said side wall in a diverting relationship between said preselected water flow pattern and said skimmer.

4,707,254

APPARATUS FOR PURIFYING WATER

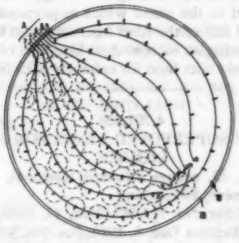
Sjoerd H. J. Vellinga, Wommels, Netherlands, assignor to Paques B.V., Netherlands

Continuation of Ser. No. 756,649, Jul. 19, 1985, abandoned. This application Mar. 11, 1987, Ser. No. 24,511

Claims priority, application Netherlands, Jul. 19, 1984, 8402281

Int. Cl.⁴ B01D *21/24*

U.S. Cl. 210—199 **4 Claims**



1. Apparatus for anaerobically purifiying water containing material dissolved or dispersed therein, comprising an upflow reactor in which, while maintaining a sludge blanket, the water to be purified can be contacted with one or more agents to bring the dissolved or dispersed material into a form in which it can be separated from the water; means for the discharge of the purified water from the apparatus; and an influent distributing system connected to a cnetral waster supply system for receiving influent from said central water supply system, said influent distributing system including a plurality of tube members assembled to form one or more strings, said strings having outlet openings, essentially all of said outlet openings being positioned at the underside thereof, the perpendicular to the plane of the outlet openings enclosing an angle of 20°–45° with the horizontal, for introducing the water to be purified obliquely downward out of said strings into the reactor, at a plurality of spaced locations in a proportion of 1 outlet opening for each 0.5–3 m^2 reactor cross-sectional area, said strings being unbranched and rigidly positioned within the reactor, the ends of the strings remote from the end of supply of the water to be purified to the influent distributing system being provided with openable shut-off means disposed outside the reactor space and during operation being closed.

4,707,255

APPARATUS FOR MAGNETIC TREATMENT OF FLOWING LIQUID

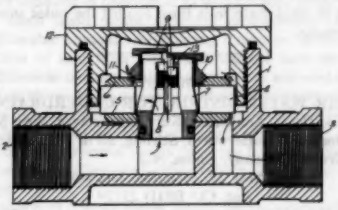
Olaf Fjeldsend, Jr., Sandefjord, Norway, assignor to Olaf Fjeldsend A/S, Sandefjord, Norway

Filed Sep. 26, 1986, Ser. No. 912,055

Claims priority, application Norway, Jul. 29, 1986, 863064

Int. Cl.⁴ B03C *1/02*; C02F *1/48*; B01D *35/06*

U.S. Cl. 210—222 **3 Claims**



1. In an apparatus for magnetic treatment of a flowing liquid, comprising a housing (1) through which the liquid shall flow, and at least one annular permanent magnet (4) having radially extending pole shoes (5, 6), the permanent magnet being mounted in the housing in such a manner that the liquid will flow from an inlet (2) through the cylindrical space of the magnet (4) and through a magnetic field gap (11) formed partially with one (6) of the magnet pole shoes, the improvement comprising a substantially cylindrical cup member (7) disposed within the cylindrical space of the magnet and coaxially thereto, in magnetic connection with the other magnet pole shoe (5), said cup member (7) being provided with openings (8) in its walls and being provided with a radially extending collar (10) of ferro-magnetic material, said collar forming, together with said one pole shoe (6) said magnetic field gap (11) and means for adjusting said magnetic field gap in which the collar (10) is axially movable relative to the cup member (7).

4,707,256

FILTER FOR SQUEEZING OUT SUSPENSIONS

Hans Gerteis, Bietigheim-Bissingen, Fed. Rep. of Germany, assignor to Heinkel Industriezentrifugen GmbH & Co., Bietigheim-Bissingen, Fed. Rep. of Germany

Filed Apr. 17, 1986, Ser. No. 853,024

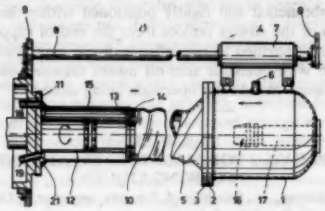
Claims priority, application Fed. Rep. of Germany, May 11, 1985, 3517032

Int. Cl.⁴ B01D *29/10, 29/38*

U.S. Cl. 210—236 **9 Claims**

1. A filter for squeezing out suspensions comprising a boiler-shaped outer casing, having an open end face, a cover releasably closing said outer casing at its open end face, a tubular filter element projecting at one end from said cover coaxially to the axis of the outer casing and having a free end face at the other end, an elastic, hose-like membrane arranged coaxially between the outer casing and the filter element, said membrane

having a slack state and being connected at one edge to the open end face of the outer casing and at the other edge to the free end face of the filter element remote from the cover such that the membrane is inverted when the cover is removed coaxially from the outer casing, also comprising a short suction and pressure connection pipe on the outer casing, a feed pipe



for the suspension and an outlet pipe for filtrate, these pipes being provided on the cover, and the inner diameter of the membrane (5) in the region of the filter element (15) is smaller than the outer diameter of said filter element and the membrane in its slack state rests flush against the outer side of the filter element.

4,707,257

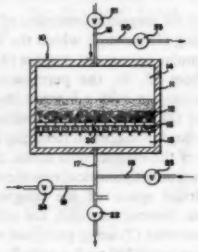
AIR/WATER DISTRIBUTOR UNDERDRAIN

Thomas A. Davis, Annandale; Kurt Bozenmayer, West Milford, and Donald J. Butterworth, Stirling, all of N.J., assignors to The Graver Company, Union, N.J.

Filed May 29, 1986, Ser. No. 868,649

Int. Cl.[4] B01D *23/24*

U.S. Cl. 210—274 **25 Claims**



1. In an apparatus including a filter bed supported above a floor defining an inlet chamber thereabove and an outlet chamber therebelow; an improved air/water underdrain distributor assembly comprising: a distribution member attached to the upper surface of said floor, said distributor member having a substantially horizontal surface spaced above said floor and a wall extending downwardly therefrom towards said floor so as to define a distributor chamber in communication with an opening extending through said floor; first and second spaced apart openings extending through said horizontal surface; a shroud extending downwardly from said first openings having a first end portion in fluid communication with said first openings and a second end portion in communication with an intermediate portion of said distributor chamber; and means for directing backwash water and gas into said outlet chamber upwardly through said opening in said floor into said distributor chamber such that gas collects in a gas compartment formed in an upper portion of said distributor chamber and is directed through said second openings upwardly through said filter bed and backwash water collects in a backwash water compartment formed in a lower portion of said distributor chamber and is directed upwardly through said shrouds and said first openings through said filter bed.

4,707,258

DISK FILTER

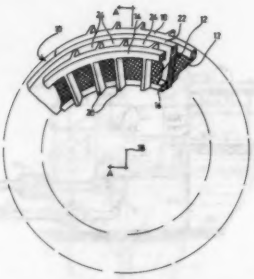
Mordeki Drori, 89 Zahal Street, Kiron, Israel

Filed Jun. 10, 1986, Ser. No. 872,490

Claims priority, application Israel, Jun. 10, 1985, 75473

Int. Cl.[4] B01D *27/12, 29/38*

U.S. Cl. 210—333.1 **15 Claims**



1. A filter comprising structure for automatic and non-automatic filter systems designed to enable extremely fine filtering down to about 50 microns or less while providing enhanced filtering capacity, said structure including:

a housing including an inlet coupled to a fluid inlet and an outlet coupled to a fluid outlet; and

a filter assembly disposed inside the housing and arranged to intercept the flow of fluid from the fluid inlet to the fluid outlet, said filter assembly comprising a stack of filter screen elements.

each filter screen element comprising a generally annular screen and spacer means associated with the screen and defining at least one inlet chamber adjacent each annular screen at an upstream side thereof for collection of contaminants and at least one outlet passage adjacent each annular screen at a downstream side thereof for permitting drainage of filtered fluid,

said filter assembly defining a multiplicity of inlet contaminant collection chambers adjacent a multiplicity of annular screens,

wherein said annular screens are arranged to lie at a slant with respect to the plane which is perpendicular to the longitudinal axis of the filter assembly, said slant arrangement presenting an increased surface area of said annular screens to said inlet fluid for enhancing the filter capacity.

4,707,259

FILTER WITH SUPERPOSED RINGS FOR FILTERING LIQUIDS

Charles Doucet, 13, avenue Lèonard Sismondi, 1224 Chêne-Bougeries/Genève, Switzerland

Continuation of Ser. No. 712,847, Mar. 18, 1985, abandoned. This application Dec. 8, 1986, Ser. No. 939,240

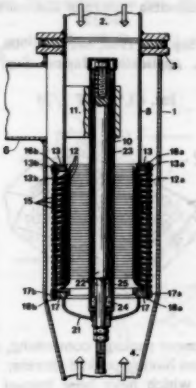
Claims priority, application Switzerland, Mar. 29, 1984, 1594/84

Int. Cl.[4] B01D *29/46*

U.S. Cl. 210—351 **7 Claims**

1. A disc-type filter with superposed rings arranged to be cleaned by counter-current flow of a liquid and consisting of a series of coaxial ring-shaped filter elements assembled to form a filter body of a generally cylindrical shape around a filter axis, with ring-shaped passages provided between the filter elements, and including spacing elements capable of an elastic deformation disposed between the filter elements and arranged for varying without friction the distance separating the filter

elements by varying the axial pressure exerted on the spacing elements when stopping the filtering to clean the filter and when reverting from cleaning to filtering, wherein the improvement comprises that the filter elements (12) have a shape so as to provide filtering passages which are initially radial and progressively narrowing, said filter passages, at least in their portion closest to the filter axis where during the cleaning operation the liquid penetrates in said passages being oblique relative to the axis of the filter when viewed in a cross section taken along the axis of the filter, and that each said filter element (12) is provided with stopping means (19, 20) for abutting against the adjacent filter element when the filter elements are subjected to an axial pressure during the filtering, thereby ensuring that a preselected width is achieved in the narrowest part of the passages and that the filter elements are prevented from vibrating during the filtering as a result of the liquid flowing between the filter elements, said stopping means being freed from their contact with the adjacent filter element during the cleaning of the filter to allow the filter elements to vibrate and thereby improve the cleaning.



4,707,260

SOLID LIQUID SEPARATION DEVICE

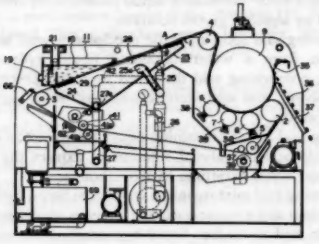
Takashi Nagayama, Kusatsu; Mitsunobu Otani, Otsu, and Tamotsu Date, Shiga, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

PCT No. PCT/JP84/00410, § 371 Date Apr. 25, 1986, § 102(e) Date Apr. 25, 1986, PCT Pub. No. WO86/01429, PCT Pub. Date Mar. 13, 1986

PCT Filed Aug. 27, 1984, Ser. No. 860,193

Int. Cl.[4] B01D *33/04*

U.S. Cl. 210—386 **50 Claims**



1. A solid-liquid separation device comprising;

an unidirectionally circulating endless filter cloth having a napped filter layer on its front surface;

a solid-liquid mixture supply means provided on the front side of said filter cloth;

a depressurizing suction means provided on the backside of said filter cloth adjacent to said solid-liquid mixture supply means;

said depressurizing suction means including a depressurized suction port facing the backside of said filter cloth and splaying in the running direction of said filter cloth;

said depressurized suction port having at least one group of filter cloth guide rolls on each of left and right sides of the running direction of said filter cloth; and

the filter cloth guide rolls in each left and right group of the filter cloth guide rolls angled outwardly in the running direction of said filter cloth;

a non-filterable content withdrawing means provided downstream of said solid-liquid mixture supply means and said depressurizing suction means in the running direction of said filter cloth, said non-filterable content withdrawing means including:

a transfer drum installed on the front side of said filter cloth;

at least one compression roll installed on the backside of said filter cloth in opposition to said transfer drum; and

a scraper installed in opposition to said transfer drum; and

a filter cloth wash means provided downstream of said non-filterable content withdrawing means in the running direction of said filter cloth and located between said non-filterable content withdrawing means and said solid-liquid mixture supply means or said depressurizing suction means, wherein said depressurizing suction means further includes a pair of suction port control sheets;

said suction port control sheets covering both outside edge portions of the filter cloth guide rolls in the left and right groups;

said suction port control sheets having insides edges defining edges of said depressurized suction port; and

means for increasing a distance between the inside edges of said suction port control sheets along the running direction of said filter cloth, so that said filter cloth can slidingly contact the inside edges of said suction port control sheets with a width determined by an inclination of the inside edges of said suction port control sheets.

4,707,261

TUBULAR MEMBRANE ULTRAFILTRATION MODULE

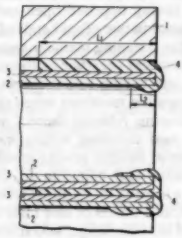
Norio Ikeyama; Noriaki Yoshioka; Shusaku Tamaru, and Hisashi Ichinose, all of Osaka, Japan, assignors to Nitto Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 237,050, Feb. 23, 1981, abandoned, which is a continuation of Ser. No. 65,018, Aug. 9, 1979, abandoned. This application Feb. 22, 1983, Ser. No. 468,746

Claims priority, application Japan, Aug. 9, 1978, 53-97734

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—433.2 **8 Claims**



1. A parallel-flow tubular membrane ultrafiltration module comprising: an outer cylinder of a given length, a plurality of water permeable non-woven fabric pipes each having a perme-

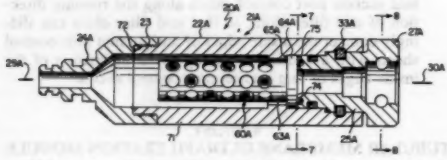
able membrane formed on the inside thereof and having substantially the same length as the given length of the outer cylinder, said cylinder having a common take-off port from said non-woven fabric pipes, said non-woven fabric pipes each being inserted into the outer cylinder in a closely bundled state with each other and having their open ends arranged even with the ends of the outer cylinder, spaces between the outer cylinder and the non-woven fabric pipes at both end portions of the outer cylinder being filled solely with a first hardened synthetic resin bonding the pipes to each other and fixing them to the outer cylinder to provide sealing, the ends of each of the non-woven fabric pipes and the ends of the permeable membranes neighboring the ends of the non-woven fabric pipes being coated solely with a second synthetic resin which may be the same as or different from the first synthetic resin filling any spaces between the outer cylinder and the non-woven fabric pipes, wherein only said first and second resins are utilized for sealing and retaining said non-woven fabric pipes at said ends of said outer cylinder, the permeable membrane in each pipe having an inner diameter of about 4 to 25 mm, and the depth in a longitudinal direction of the non-woven fabric pipes of the coating of the second synthetic resin on the permeable membrane at the inside neighboring the open end of the non-woven fabric pipes being less than the depth in the longitudinal direction of the pipes of the first synthetic resin outside each of the non-woven fabric pipes.

4,707,262

HOSE CONSTRUCTION, COUPLING ARRANGEMENT THEREFOR AND METHOD OF MAKING THE SAME

Joseph S. Murken, Springfield, Mo., assignor to Dayco Products, Inc., Dayton, Ohio

Filed Jul. 2, 1986, Ser. No. 881,533
Int. Cl.[4] B01D *35/00*
U.S. Cl. 210—448 **11 Claims**



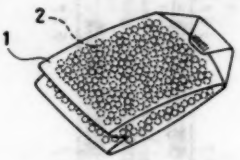
1. In a coupling arrangement for conveying fluid therethrough and having a filter unit disposed therein to filter the fluid flow through said coupling arrangement, the improvement wherein said coupling arrangement is a quick connect-disconnect coupling arrangement that comprises a first tubular coupling member having opposed open ends, a second tubular coupling member having opposed open ends one of which is telescopically disposed in one of said ends of said first coupling member, a staple-like fastening member securing said one ends of said coupling members together in the telescoping relation thereof, said filter unit having means that is held between said one ends of said coupling members when said one ends are in said secured telescoping relation thereof whereby said filter unit is secured in said coupling arrangement by said means thereof, and an annular flexible sealing member carried by said coupling arrangement and being in a compressed relation therein to provide a loading force on said filter unit and on said staple-like member, said means of said filter unit comprising an outwardly directed annular flange, said filter unit comprising a cylindrical member having opposed ends, said annular flange being located at one of said ends of said cylindrical member, said one end of said first coupling member having an internal annular shoulder means, said one end of said second coupling member having an annular shoulder means, said annular flange of said filter unit being held in sandwiched relation between said shoulder means when said one ends are in said secured telescoping relation, one of said shoulder means carries said annular flexible sealing member in said compressed relation between said one shoulder means and said annular flange of said filter unit when said one ends are in said secured telescoping relation.

4,707,263

WATER TREATMENT PACKAGE

Shozo Nishimori, and Chikashi Eguma, both of Shiga, Japan, assignors to Shiraimatsu Shinyaku Kabushiki Kaisha, Shiga, Japan

Filed Sep. 11, 1986, Ser. No. 906,056
Claims priority, application Japan, Sep. 19, 1985, 60-143771[U]
Int. Cl.[4] C02F *1/28*
U.S. Cl. 210—484 **11 Claims**



1. A water treatment package comprising, a water-permeable packaging means having packed therein;

bisque granules which have been burned in an oxidizing atmosphere at a high temperature, on which a distillation or extraction product which is obtained and separated from tea leaves by dry-distillation or extraction is adsorbed.

4,707,264

WATER EXTRACTION FROM HYDROCARBONS IN THE PRESENCE OF ASPHALTIC PRECIPITATES

Mark A. Plummer, Littleton, Colo., assignor to Marathon Oil Company, Findlay, Ohio

Filed Apr. 28, 1986, Ser. No. 856,744
Int. Cl.[4] B01D *11/00*
U.S. Cl. 210—634 **17 Claims**

1. A process for solubilizing solid asphaltic precipitates entrained in a water-containing liquid paraffinic hydrocarbon while extracting the water from said liquid paraffinic hydrocarbon, the process comprising:

(a) adding a solvent to said water-containing liquid paraffinic hydrocarbon having said solid asphaltic precipitates entrained therein, said solvent comprising a bulk aromatic hydrocarbon and an alcohol dispersant, wherein said alcohol dispersant has a molecular weight between pentanol and octanol inclusive and is preferentially more soluble in said water-containing liquid paraffinic hydrocarbon than in an aqueous glycol solution;

(b) dissolving said solid asphaltic precipitates with said solvent to form a water-containing liquid hydrocarbon stream, comprising said dissolved asphaltic precipitates, said solvent, and said water-containing liquid paraffinic hydrocarbon;

(c) mixing said water-containing liquid hydrocarbon stream with said aqueous glycol solution to extract the water from said liquid paraffinic hydrocarbon; and

(d) separating said mixture into a water-free liquid hydrocarbon stream and a water-enriched aqueous glycol solution, wherein said water-free liquid hydrocarbon stream comprises said liquid paraffinic hydrocarbon substantially free of water, said solvent, and said dissolved asphaltic precipitates and wherein said water-enriched aqueous glycol

solution comprises said aqueous glycol solution and the water extracted from said water-containing liquid hydrocarbon stream.

4,707,265

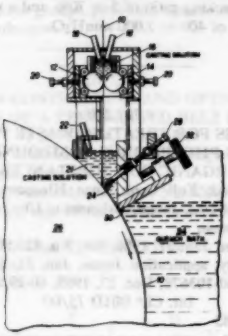
REINFORCED MICROPOROUS MEMBRANE

Robert G. Barnes, Jr., Meriden, and Mark T. Meyering, Middlefield, both of Conn., assignors to Cuno Incorporated, Meriden, Conn.

Continuation of Ser. No. 651,376, Sep. 17, 1984, Pat. No. 4,645,602, which is a continuation of Ser. No. 322,068, Dec. 18, 1981, abandoned. This application Sep. 30, 1985, Ser. No. 761,948

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—638 **8 Claims**



1. A process for the filtration of liquids having particulate contaminants therein, comprising passing the liquid through a microporous reinforced laminated filtration membrane comprising:

(a) a porous reinforcing web impregnated with a polymeric substantially isotropic microporous inner membrane,

(b) at least one polymeric substantially isotropic microporous outer membrane laminated to each side of the impregnated web, each of said outer membranes having a pore size of at least about 0.05 microns,

wherein the ratio of the pore size of the inner membrane to the outer membranes is from about 1.5:1 to about 6:1,

whereby the particular contaminants are retained on the reinforced laminated filtration membrane.

4,707,266

POLYAMIDE MEMBRANE WITH CONTROLLED SURFACE PROPERTIES

Peter J. Degen; Irving B. Joffee, both of Huntington, and Thomas C. Gsell, Levittown, all of N.Y., assignors to Pall Corporation, Glen Cove, N.Y.

Continuation of Ser. No. 459,956, Jan. 21, 1983, abandoned, which is a continuation-in-part of Ser. No. 346,118, Feb. 5, 1982, abandoned. This application Apr. 7, 1986, Ser. No. 850,061

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—638 **65 Claims**

26. A surface modified, skinless, hydrophilic, microporous, alcohol-insoluble polyamide membrane derived from an alcohol-insoluble hydrophobic polyamide resin having a ratio CH_2:NHCO of methylene CH_2 to amide NHCO groups within the range of from about 5:1 to about 7:1, said membrane having an integral microstructure and characterized by (1) the surface properties thereof being substantially controlled by functional polar groups of a membrane surface modifying polymer having a molecular weight of 20,000 or greater, said functional polar groups selected from the group consisting of hydroxyl, carboxyl, and amino, or a non-reacting combination thereof, (2) said membrane surface modifying polymer being homogeneously distributed in said membrane, and (3) having the capability of reacting or interacting in a controlled manner with (a) particulate matter in a fluid, (b) non-particulate matter in a fluid, or (c) both (a) and (b).

4,707,267

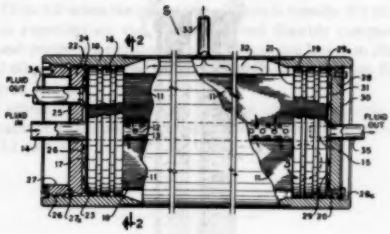
DEVICE AND METHOD FOR SEPARATING INDIVIDUAL FLUIDS FROM A MIXTURE OF FLUIDS

Homer K. Johnson, Antioch, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Filed Jan. 22, 1987, Ser. No. 5,803

Int. Cl.[4] B01D *13/01*

U.S. Cl. 210—650 **3 Claims**



2. A method for separating individual fluids from a fluid stream that contains a mixture of permeate fluids and nonpermeate fluids, comprising the steps of:

placing a bundle of spaced-apart hollow fiberes inside an elongate housing, to define a separator device;

installing an elongate, perforated distributor tube in the center of the hollow fiber bundle;

fastening each hollow fiber into a first tube sheet at one end of the fiber bundle, and into a second tubesheet at the opposite end of the fiber bundle;

cutting an internal thread segment into one end of the housing;

placing a flange inside the housing adjacent to the internal thread segment, said flange is movable forward and backward inside the housing;

providing an adjustment ring having external threads which can engage the internal thread segment;

threading the adjustment ring into the housing to the point where it contacts the movable flange, and thereafter moving the adjustment ring forward or backward to thereby adjust the position of the movable flange;

installing a stationary flange inside the housing at the end opposite from the movable flange, such that the flange is in contact with the second tubesheet;

installing a first fluid outlet in the housing, said outlet communicates with a space between the fiber bundle and the housing;

installing a second fluid outlet in the movable flange, said outlet communicates with a space between the movable flange and the first tubesheet;

installing a third fluid outlet in the stationary flange, said outlet communicates with a space between the second tubesheet and the stationary flange;

directing the fluid stream containing the permeate and nonpermeate fluids into the distributor tube at a pressure of from about 10 to about 1000 psia;

flowing the permeate fluid from the distributor tube through the walls of each hollow fiber, and carrying said fluid out of the separator device through the second and third fluid outlets; and

flowing the nonpermeate fluid through the spaces between the hollow fibers in the bundle and carrying said fluid out of the separator device through the first fluid outlet.

4,707,268

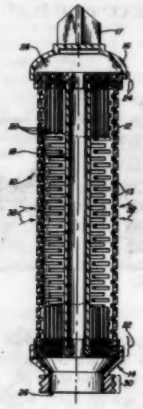
HOLLOW FIBER POTTED MICROFILTER

Dilip H. Shah, Gurnee, and Clinton Kopp, Barrington, both of Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Continuation of Ser. No. 546,333, Oct. 28, 1983, abandoned, which is a continuation of Ser. No. 434,988, Oct. 18, 1982, abandoned. This application Jan. 22, 1986, Ser. No. 821,512

Int. Cl.[4] B01D *13/01*

U.S. Cl. 210—650 1 Claim



1. A fluid filtration method comprising the steps of, conducting a fluid stream within a housing having longitudinally spaced opposite end portions past a microporous hollow fiber membrane arranged longitudinally in the housing and having an axial bore with opposite open ends located adjacent to the opposite end portions of the housing,

filtering filtrate from the fluid stream through the portions of the fiber and into the fiber bore,

conducting the filtrate within the fiber bore simultaneously through the opposite open ends of the fiber,

collecting the filtrate within the housing at one of the opposite open ends of the fiber in a first manifold which closes one of the opposite end portions of the housing and which has no port, while simultaneously collecting the filtrate within the housing at the other opposite end of the fiber in a second manifold which closes the other opposite end portion of the housing and which has an outlet port,

transporting the filtrate collected in the first manifold internally through the housing into the second manifold, there combining this filtrate with filtrate collected in the second manifold, and

discharging the combined filtrate through the outlet port of the second manifold.

4,707,269

METHOD FOR SEPARATING AN OIL FROM AN OIL-CONTAINING LIQUID

Kazuto Ohue, Takatsuki; Toshiyuki Kondou, Ibaraki; Hisaharu Takeuchi, Ibaraki, and Yuzo Ikeda, Ibaraki, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Japan

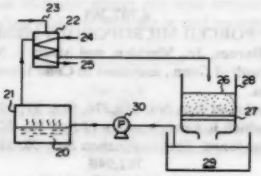
Division of Ser. No. 822,200, Jan. 24, 1986, Pat. No. 4,663,222. This application Apr. 15, 1987, Ser. No. 38,759

Claims priority, application Japan, Jan. 25, 1985, 60-11027; Jan. 25, 1985, 60-11028; May 9, 1985, 60-96748

Int. Cl.[4] B01D *37/00*

U.S. Cl. 210—651 4 Claims

1. A method for separating an oil from an oil-containing liquid, which comprises passing the oil-containing liquid through an oil-water separating filter comprising a nonwoven fabric, under a pressure loss higher than the water pressure resistance index of said nonwoven fabric to form coalescent fine oil droplets and separating the coalescent oil droplets, said nonwoven fabric being made of a melt-blown fiber having a



single filament denier of 0.005 to 2.0 and said nonwoven fabric having a fiber packing ratio of 5 to 70% and a water pressure resistance index of 400 to 2,000 mmH_2O.

4,707,270

PROCESS FOR TREATING WASTE WATER CONTAINING PHOSPHORUS COMPOUNDS AND/OR ORGANIC COD SUBSTANCES

Waichi Kobayashi; Koji Usui; Kozo Hirosawa, and Tetsuya Sadatani, all of Ube, Japan, assignors to Ube Industries, Ltd., Yamaguchi, Japan

Filed Jan. 31, 1986, Ser. No. 824,906

Claims priority, application Japan, Jan. 31, 1985, 60-15366; May 17, 1985, 60-103678; Dec. 27, 1985, 60-292819

Int. Cl.[4] B01D *15/00*

U.S. Cl. 210—683 25 Claims

1. A process for teating waste water containing phosphorus compounds and/or organic oxidizable pollutants, which consists essentially of: contacting said waste water with particles of a calcium silicate treating agent consisting of a burned product which has been prepared by burning, at a temperature of from 1300° to 1600° C., a mixture consisting of a calcium compound which is thermally decomposed to form CaO at said temperature and a SiO_2-containing compound, the molar ratio of CaO/SiO_2 in said burned product being in the range of from 1.5 to 5.0; adsorbing said phosphorus compounds and/or said pollutants on the surfaces of the particles of said treating agent; and then separating from the water, said treating agent together with the phosphorus compounds and/or pollutants that are adsorbed thereon.

4,707,271

STABILIZATION OF IRON IN AQUEOUS SYSTEMS

Zahid Amjad, Avon Lake, and William F. Masler, III, Hinckley, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

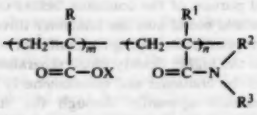
Filed Nov. 1, 1985, Ser. No. 793,815

The portion of the term of this patent subsequent to Jan. 28, 2003, has been disclaimed.

Int. Cl.[4] C02F *5/12*

U.S. Cl. 210—701 12 Claims

1. A method for maintaining iron stabilized in an aqueous system containing soluble iron and for inhibiting precipitation of phosphate scale, the method comprising the step of adding to said aqueous system 0.05 to 500 ppm of a water-soluble non-crosslinked random copolymer of 50 to 90 weight parts of an acrylic acid and 10 to 50 weight parts of substituted acrylamides, on the basis of a total of 100 weight parts of all monomers polymerized, said copolymer having weight average molecular weight of about 1,000 to 50,000 and the polymerized units of said acrylic acid and said substituted acrylamides are defined by the following formulas:



where m is in the range of about 10 to 700 and n is in the range of about 0.1 to 350, subject to the molecular weight limitation; R and R^1 are individually selected from hydrogen and methyl; X is selected from hydrogen, sodium, potassium, calcium, ammonium, and magnesium moieties; and R^2 and R^3 are individually selected from hydrogen and substituted and unsubstituted groups each containing a total of 1 to 8 carbon atoms, wherein the substituents on R_2 and/or R^3 are selected from alkyl, aryl, and keto groups, provided that either R^2 and/or R^3 is other than hydrogen.

4,707,272

METHOD FOR CONTROLLING AND OPTIMIZING THE OPERATION OF A PERFORATED BELT PRESS FOR FILTERING SLURRY

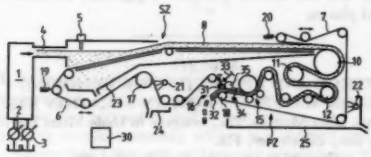
Francois Kistler, Biberist, Switzerland, assignor to Von Roll AG, Gerlafingen, Switzerland

Filed Mar. 14, 1986, Ser. No. 839,773

Claims priority, application Switzerland, Mar. 18, 1985, 1224/85

Int. Cl.⁴ B01D *37/04*

U.S. Cl. 210—709 **8 Claims**



1. A method for controlling the operation of a perforated belt press for filtering a slurry which comprises: providing two superimposed perforated belts with the lower perforated belt forming a straining zone and the two perforated belts together forming a pressing zone to form a filter cake having a dry substance content, wherein the pressing zone is downstream of the straining zone; providing regulatable parameters comprising the drive of the perforated belts, the inflow of slurry, the flocculant addition, the belt tension and the belt nip pressure; wherein in order to optimize the dry substance content of the filter cake and the flocculant inflow, the flocculant quantity in an overflocculation zone is only reduced to the extent that the slurry level at the start of the straining zone is still stabilized, wherein the dry substance content of the filter cake and the flocculant inflow is optimized by a level measurement at the start of the straining zone and wherein the time change of the level is measured, and wherein for optimizing the operation of the perforated belt press, the optimization of the flocculant inflow through the flocculant circuit is combined with the optimization of at least one of the quantities: perforated belt speed, perforated belt tension and perforated belt nip pressure.

4,707,273

MANGANESE REMOVAL FROM AQUEOUS INDUSTRIAL WASTE EFFLUENTS

Diane Halterman, Norristown, and Thomas Henley, Havertown, both of Pa., assignors to Amchem Products, Ambler, Pa.

Filed May 5, 1986, Ser. No. 860,269

Int. Cl.⁴ C02F *1/52*

U.S. Cl. 210—724 **23 Claims**

1. A method for the removal of manganese and other heavy metals and fluoride from an aqueous waste effluent containing up to about 500 ppm fluoride ion and about 0.5 to about 5 ppm manganese ion from an acid fluoride wash step in the manufacture of aluminum cans comprising

(a) adding a sufficient amount of phosphate ion to the effluent to react with the manganese and fluoride;

(b) adjusting the pH of the phosphate-treated effluent to a pH of about 2.0 to 3.0 when the pH of the effluent is outside this range;

(c) adding a sufficient amount of calcium ion to react with the manganese, fluoride, and phosphate and form a calcium-manganese-phosphate complex and a calcium-phosphate-fluoride complex;

(d) adjusting the pH of the calcium-treated effluent to about 7.0 to 9.0 when the pH of this effluent is outside this range to coprecipitate the manganese and fluoride complexes and produce a purified effluent containing less than about 0.60 ppm manganese ion and less than about 50 ppm fluoride ion; and

(e) separating the precipitate from the effluent; wherein the ratio of added phosphate ion to added calcium ion is about 3:1 to 1:2.5.

4,707,274

MULTISTAGE ARRANGEMENT FOR COUNTERCURRENT SEPARATION AND METHODS OF OPERATING SAME

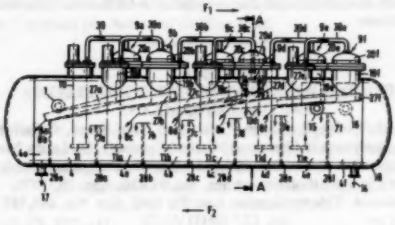
Friedrich Donhauser, Amberg; Anton Schoengen, Witten; Johann H. Schroeder, Dortmund, and Jörg Porschen, Düren, all of Fed. Rep. of Germany, assignors to Amberger Kaolinwerke GmbH, Hirschau and Dynamit Nobel AG, Cologne, both of, Fed. Rep. of Germany

Filed Dec. 31, 1986, Ser. No. 948,049

Claims priority, application Fed. Rep. of Germany, Jan. 10, 1986, 3600522; Feb. 27, 1986, 3606259; Nov. 22, 1986, 3639958

Int. Cl.⁴ B01D *17/038*

U.S. Cl. 210—774 **14 Claims**

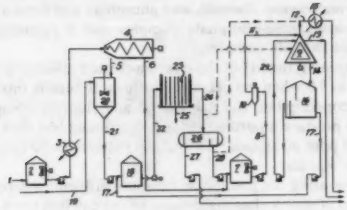


2. A method comprising producing pure terephthalic acid in an arrangement including groups of one or more hydrocyclone separators connected parallel to each other, each group of hydro-cyclone separators defining a stage, the hydrocyclone separator groups being arranged in series and including corresponding pumps and pump wells, and pipe lines connecting the hydro-cyclones, pumps and pump wells, by providing the hydro-cyclone groups, the pump wells and the pump or pump components projecting into the wells in a common pressure-proof and heat-insulated vessel defining a chamber, feeding the separating fluid in the countercurrent to the direction of feeding of the suspended solids, and treating the suspended solids under increased temperature and pressure within said chamber.

4,707,275
PROCESS FOR SEPARATING WATER AND SOLIDS FROM FUELS

Jorge H. Filho, and Dorian L. Bachmann, both of Sao Mateus do Sul, Brazil, assignors to Petroleo Brasileiro SA-Petrobras, Rio de Janeiro, Brazil

Filed Sep. 17, 1986, Ser. No. 909,067
Claims priority, application Brazil, Sep. 20, 1985, 8504611
Int. Cl.[4] B01D *21/26*
U.S. Cl. 210—787 **13 Claims**



1. A process for separating water and solid particles from a fuel oil feedstock comprising:

subjecting the feedstock to a first separation in a scroll type centrifugal separator to form a first recovered fuel stream and an oil cake;

subjecting at least the first recovered fuel stream to a second separation in a centrifugal disc separator to form a clean fuel stream, an oil-bearing water stream and a sludge stream;

treating the oil-bearing water stream in a separator to recover the oil;

treating the oil cake removed from the first separation with a solvent in order to form a suspension;

mixing the suspension with the sludge stream to form a mixture;

feeding the mixture to a filter press to yield a solid reject and a filtrate;

separating the filtrate into a decantate and recovered oil;

mixing at least a portion of the recovered oil with first recovered fuel stream to form a semi-cleaned fuel stream; and

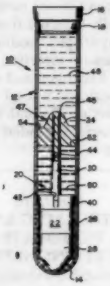
subjecting the semi-cleaned fuel stream to the second separation in a centrifugal disc separator to form said clean fuel stream.

4,707,276
FLUID COLLECTION DEVICE WITH PHASE PARTITIONING MEANS

Larry H. Dodge, LaHabra, Calif., and Glen Stone, O'Fallon, Mo., assignors to Sherwood Medical Company, St. Louis, Mo.

Continuation of Ser. No. 254,555, Apr. 15, 1981, abandoned, which is a continuation of Ser. No. 31,816, Apr. 20, 1979, abandoned. This application Apr. 22, 1983, Ser. No. 485,757
Int. Cl.[4] B01D *21/26*
U.S. Cl. 210—789 **10 Claims**

10. A method of separating whole blood into its lower density and higher density phases and providing a partition between the separated phases comprising the steps of utilizing a glass blood collection container having a chamber in the lower end portion of the container and which contains a thixotropic gel-like sealant material having a specific gravity between those of the lower and higher density phases, the container having an upper end closed by a stopper and a closed, integral, glass bottom end, said chamber having a standpipe connected thereto and in communication with the sealant and having an outlet spaced from the chamber and disposed in that portion of the container that is above the upper level of the higher density phase when separated from the lower density phase, said chamber and initially the sealant material therein being at the bottom end of the container closer to the bottom end than to the upper end of the container and in fluid communication with the lower end portion of the container before centrifugation, introducing whole blood into the container through a needle piercing the stopper, centrifuging the container with the blood therein so that the higher density phase separates to the lower end portion of the container and simultaneously urges sealant from the chamber upwardly through the standpipe and

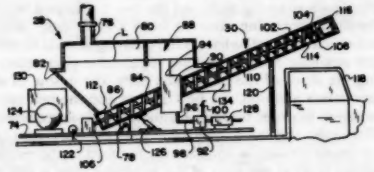


through the outlet into the container and then downwardly from the outlet to form a partition, maintaining the chamber and standpipe stationary with respect to the container during phase separation and centrifugation, and continuing centrifugation of the container at least until the phases are completely separated and the sealant provides a partition between the separated phases.

4,707,277
METHOD AND APPARATUS FOR REMOVING GRANULAR MATERIAL FROM AN AERATION BASIN

Ken Mims, Lake Monroe, Fla., assignor to Uddo Mims International, Inc., Edgewater, Fla.

Filed Mar. 20, 1985, Ser. No. 714,034
Int. Cl.[4] B01D *21/02, 36/04*
U.S. Cl. 210—805 **19 Claims**



19. A method of removing granular material from an aeration basin of a sewage plant containing waste water, sewage and granular material and returning the waste water and sewage to the aeration basin, comprising the steps of:

positioning a collector for collecting the granular material from the aeration basin;

connecting an input of a first pump in fluid tight communication with the collector;

connecting a conduit in fluid tight communication with an output port of the first pump;

connecting the conduit to a mobile reservoir disposed outside the aeration basin;

pumping the sewage and waste water together with removed granular material such that the granular material flows from the aeration basin through the collector, first pump and conduit towards the mobile reservoir;

settling the granular material within the mobile reservoir

such that the granular material settles towards an outlet of the mobile reservoir;

separating the granular material from the sewage and waste water such that the separated granular material is conveyed angularly relative to the reservoir thereby permitting sewage, waste water and entrained granular material to be conveyed away from the first opening of the separator towards a second opening of the separator, so that the waste water drains back towards the first opening and the granular material is separated from the waste water and conveyed towards the second opening for discharge therefrom; and

pumping the sewage and waste water from the reservoir back to the aeration basin.

4,707,278

CONTROL VALVE

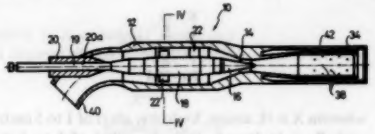
Karl Breyer, Ingelfingen, and Roland Tesar, Winterbach, both of Fed. Rep. of Germany, assignors to Herion-Werke KG, Fellbach, Fed. Rep. of Germany

Filed Dec. 2, 1985, Ser. No. 803,392

Claims priority, application Fed. Rep. of Germany, Dec. 3, 1984, 3444039

Int. Cl.[4] F16K *1/38, 1/42, 47/02*

U.S. Cl. 251—122 **18 Claims**



1. A control valve; comprising:

a valve box defining an axis and having an interior;

a valve seat accommodated in said interior; and

a valve needle extending within said interior and closing against said valve seat, said interior of said valve box being subdivided in sections in direction of said axis and including a first bore tapering towards said valve seat and a second bore tapering from said valve seat towards an area of minimum cross section, each of said first and second bores being defined by an angle of taper, the taper angle of said second bore being smaller than the taper angle of said first bore.

4,707,279

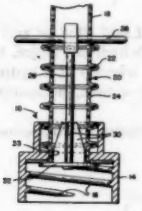
SELF-SEATING VALVE WITH COMPRESSIVE RELEASE

Gary C. Walls, R.D. #1, Marion Center, Pa. 15759

Filed Nov. 19, 1986, Ser. No. 932,411

Int. Cl.[4] F16K *31/00*

U.S. Cl. 251—339 **9 Claims**



1. A valve comprising:

(a) a flexible tubular valve body having a longitudinal section capable of elastic axial compression and having a first open end and a second open end;

(b) a diametrical bar attached inside said tubular valve body between said first end and said longitudinal section;

(c) an elongated valve stem attached to said diametrical bar and extending longitudinally through said valve body to a point adjacent to said second end;

(d) a valve seat coaxial with said valve body and adjacent to said second open end; and

(e) a valve element attached to the other end of said valve stem and of a diameter greater than that of said valve seat, said valve element being displaceable between a first position in sealing engagement with said valve seat and a second position remote from said valve seat upon the axial compression of said longitudinal section and between said second position and said first position upon the release of said axial compression.

4,707,280

LUBRICATING OIL FOR USE IN FLON ATMOSPHERE

Takashi Kaimai, Saitama, and Sampo Kusayanagi, Kanagawa, both of Japan, assignors to Nippon Mining Co., Ltd., Tokyo, Japan

Filed May 20, 1986, Ser. No. 864,990

Claims priority, application Japan, May 20, 1985, 60-105956

Int. Cl.[4] C10M *155/02*

U.S. Cl. 252—49.6 **3 Claims**

1. A lubricating oil composition comprising a base oil having incorporated therein from 20 to 10,000 wt ppm of a methylpolysiloxane whose methyl groups are partially replaced with a higher fatty acid having from 12 to 18 carbon atoms.

4,707,281

DRILLING FLUID ADDITIVE CONTAINING HIGH PYRUVATE XANTHAN

James W. Miller, Ledyard, and John J. O'Neill, Norwich, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Filed Jun. 3, 1985, Ser. No. 740,658

Int. Cl.[4] C09K *7/02*

U.S. Cl. 252—8.514 **16 Claims**

1. A drilling fluid which comprises water, solids to increase the drilling fluid density and an additive comprising high pyruvate xanthan containing about 5 to 9 percent by weight pyruvic acid and locust bean gum wherein the weight ratio of high pyruvate xanthan to locust bean gum is from about 40:60 to 80:20, said additive being present in an amount of about 0.2 to 5 pounds per barrel of drilling fluid.

4,707,282

SYNERGISTIC ANTIMICROBIAL OR BIOCIDAL MIXTURES

Harold W. Rossmoore, Oak Park, Mich., assignor to The Board of Governors of Wayne State University, Detroit, Mich.

Division of Ser. No. 728,793, Apr. 30, 1985, Pat. No. 4,666,616. This application Mar. 20, 1987, Ser. No. 28,553

Int. Cl.[4] C10M *139/00, 129/00*

U.S. Cl. 252—11 **22 Claims**

1. A concentrated composition which comprises in admixture:

(a) a heavy metal ion (A) in an amount between about 50 and 250 ppm; and

(b) a biocide (B) which contains or releases a lower aldehyde containing 1 to 5 carbon atoms in an aqueous solution selected from thiazine biocides, wherein the heavy metal ion with the biocide is toxic to fungal and bacterial growth, wherein the biocide (B) is present in an amount with the metal ion (A) which is less than is required for suppressing fungal and bacterial activity alone when the composition is introduced into a fluid which contains both the fungi and bacteria and wherein the fungal and bacterial growth is suppressed for 72 hours in the presence of 1% by weight iron chips in the solution.

4,707,283

ELECTROCHROMIC MATERIAL AND LUBRICANT

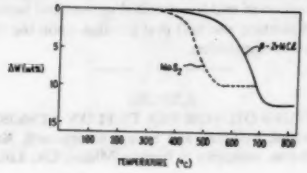
Makoto Hottori, and Shoji Yamanaka, both of Hiroshima, Japan, assignors to Daicel Chemical Industries, Ltd., Osaka, Japan

Division of Ser. No. 782,247, Sep. 30, 1985, Pat. No. 4,669,830, which is a division of Ser. No. 597,986, Apr. 4, 1984, Pat. No. 4,562,056. This application Jan. 30, 1987, Ser. No. 9,155

Claims priority, application Japan, Apr. 18, 1983, 58-68130; Jul. 22, 1983, 58-133779; Feb. 3, 1984, 59-18876

Int. Cl.[4] C10M *1/10*

U.S. Cl. 252—25 **4 Claims**



1. A lubricating composition which comprises a lubricating base oil or grease and from 0.1 to 10 percent by weight, based on the base oil or grease, of a layered compound of beta-ZrNX in which X is chlorine, bromine or a solid solution of chlorine and bromine.

3. A self-lubricating member which comprises a base material and as a lubricating agent from 2 to 50 percent by weight, based on the material, of a layered compound of beta-ZrNX in which X is chlorine, bromine or a solid solution of chlorine and bromine.

4,707,284

LUBE OIL ANTI-WEAR AGENT

Irwin L. Goldblatt, Edison, and Harold Shaub, Berkeley Heights, both of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Dec. 23, 1985, Ser. No. 811,999

Int. Cl.[4] C10M *129/00*

U.S. Cl. 252—32.7 E **4 Claims**

1. A lube oil having improved anti-wear properties comprising:

A. a lubricating oil;

B. about 0.1 to about 1.5 wt.% diphenyl carbonate; and

C. about 0.5 to about 2.0 wt.% of a zinc dialkyldithiophosphate.

4,707,285

HAZE-FREE POLYMER ADDITIVES FOR FUELS AND LUBRICANTS

Phillip W. Brewster, and Clinton R. Smith, both of Camlachie, Canada, assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Continuation of Ser. No. 709,680, Mar. 8, 1985, abandoned, which is a continuation of Ser. No. 278,179, Jun. 29, 1981, abandoned. This application Jan. 16, 1987, Ser. No. 3,780

Int. Cl.[4] C10M *119/14*

U.S. Cl. 252—50 **12 Claims**

1. A process for preparing a substantially haze-free mineral hydrocarbon oil solution concentrate composition which comprises a mineral oil of lubricating viscosity and from about 0.1 to 50 wt. % based upon the total weight of said composition of a dispersant-viscosity index improver material having haze forming tendencies, said dispersant-viscosity index improver having been formed by grafting a copolymer consisting of ethylene and propylene in the presence of a free radical iniator with (a) a vinyl containing nitrogen monomer selected from the group consisting of vinyl pyridine, lower alkyl (C_1–C_{18}) substituted C-vinyl pyridine and N-vinyl pyrrolidine or, (b) a monomer system comprising maleic anhydride and monomers copolymerizable therewith being alpha-beta mono-ethylenically unsaturated monomers containing up to 10 carbon atoms and post reacting the graft with a polyamine or, (c) maleic anhydride, which graft is subsequently reacted with a polyamine, polyol, or hydroxy amine, said process consisting essentially of treating the concentrate composition with about 0.5 to 25% by wt., based upon the weight of said composition of an oil-soluble alkyl hydroxy benzene compound, said compound containing 1–3 alkyl groups, each containing about 8–12 carbon atoms and said compound having 1–3 hydroxy groups, at a temperature of about 50° C. to 150° C.

4,707,286

COOLANT STABILIZER

Richard P. Carr, Naperville, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.

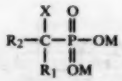
Filed Dec. 16, 1985, Ser. No. 808,997

Int. Cl.[4] C09K *5/00*

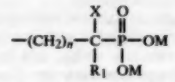
U.S. Cl. 252—75 **13 Claims**

1. A stabilizer for alkali metal silicate inhibited coolant compositions comprising, in combination:

(A) an organic phosphonate compound of the general formula

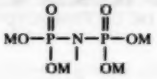


wherein X is H, amine, hydroxy, alkyl of 1 to 5 carbons, or aryl; R_1 is hydrogen, hydroxy, alkyl of 1 to 5 carbons, aryl, or a radical of the formula



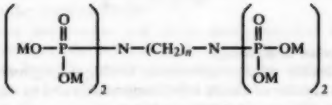
wherein n is an integer from 0 to 8; R_2 is hydrogen, alkyl of 1 to 5 carbons, aryl, or a radical of one of the formulas

or

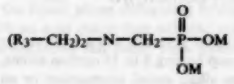


wherein any of said alkyl or aryl may be independently substituted with hydroxy, amine, halide, or alkoxy of 1 to 3 carbons; and wherein M is hydrogen or a water-soluble cation such as sodium, potassium, ammonium, and the like;

or an organic phosphonate compound of the general formula

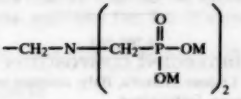


wherein n is an integer from 1 to 6 and M is as defined above;
or an organic phosphonate compound of the general formula

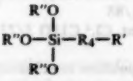


wherein M is as defined above and R_3 is a radical of one of the formulas

or



wherein M is as defined above; and
(B) an organic silicon compound of the general formula



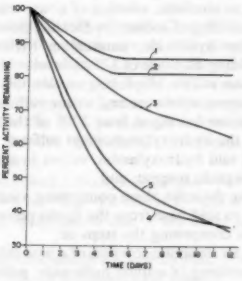
wherein R_4 is alkyl of 1 to 8 carbons, R' is a water-solubilizing group, and R'' is hydrogen, alkyl of 1 to 3 carbons, or a water-soluble cation such as sodium, potassium, ammonium, and the like, and wherein R_4 may be substituted with hydroxy, amine, halide or alkoxy of 1 to 3 carbons, wherein the proportions of said organic phosphonate compound to said organic silicon compound are selected to provide from 30 to 200 ppm of said organic phosphonate and from 250 to 2,000 ppm of said organic silicon when said stabilizer is added to an aqeuous coolant composition.

4,707,287

DRY BLEACH STABLE ENZYME COMPOSITION

Robert W. Herdeman, Loveland, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jun. 28, 1985, Ser. No. 750,715
Int. Cl.[4] C11D *3/386, 3/39;* **C12N** *9/96, 9/98*
U.S. Cl. 252—91 **24 Claims**



1. A dry peroxyacid bleach and enzyme granular mixture composition comprising an alkaline buffer salt protective coated enzyme granulate and a peroxyacid bleach granulate having a weight ratio of enzyme granulate to bleach granulate of from 1:1 to 1:1500; wherein said enzyme granulate comprises a core of enzyme material and a protective coating containing an effective amount of alkaline buffer salt surrounding said enzyme core and wherein said effective amount of alkaline buffer salt is selected from the group consisting of potassium bicarbonate, potassium carbonate, sodium bicarbonate, and mixtures thereof; and wherein said protective coating contains an antioxiant and is selected from the group consisting of sodium sulfite, sodium bisulfite and sodium thiosulfate, and mixtures thereof; and wherein said enzyme granulate is surrounded with from about 5% to about 57% of an overcoating of water-soluble nonionic wax having a melting point of at least about 38° C.

20. The composition of claim **1** wherein said enzyme granulate is made by a process comprising the following steps:

1. Completely coating an enzyme core with from 10% to 100%, based on weight of core, of a protective alkaline buffer salt solution having a pH of from above 7 to about 11 via a 15% to 70% solution;
2. Drying said coated core of Step 1 in a fluid bed dryer to provide said improved water-soluble enzyme granulate composition;

wherein said enzyme granulate comprises from 33% to 90% of said enzyme core, and from 5% to 67% of said alkaline buffer salt on a dry weight basis.

4,707,288

PROCESS FOR PREPARING DETERGENT BARS

Geoffrey Irlam, Birkenhead, and Ian J. Smith, Cambridge, both of England, assignors to Lever Brothers Company, New York, N.Y.

Filed Oct. 3, 1985, Ser. No. 783,980
Claims priority, application United Kingdom, Oct. 8, 1984, 8425369
Int. Cl.[4] C11D *9/32, 13/18*
U.S. Cl. 252—121 **6 Claims**

1. A process for preparing a detergent bar comprising:
(i) mixing water-soluble salts of long chain (C_8 to C_{22}) monocarboxylic acids and water-soluble acyl (C_8 to C_{22}) isethionates in the weight ratio of 95:5 to 60:40 respectively, and subjecting said mixture to temperatures in the range of from 60° C. to about 90° C. under conditions of shear; and
(ii) extruding said mixture to form a detergent bar.

4,707,289

ALPHA-SULFO-FATTY ACID ESTER AND/OR AMIDE SALT(S) DETERGENT LAUNDRY BARS AND PROCESSES FOR MANUFACTURE THEREOF

Pallassana N. Ramachandran, Robbinsville, and Patrizia Barone, Piscataway, both of N.J., assignors to Colgate Palmolive Company, New York, N.Y.

Filed Mar. 6, 1986, Ser. No. 836,910
Int. Cl.[4] C11D *17/00*
U.S. Cl. 252—135 **19 Claims**

1. A built synthetic organic detergent laundry bar consisting essentially of 10 to 40% of water soluble salt selected from the group consisting of alpha-sulfo-higher fatty acid-lower alkyl amide, and mixtures thereof (ASFA derivatives), 10 to 50% of builder(s) for such ASFA derivative(s), 5 to 40% of bentonite, and 10 to 30% of water, which water includes water removable from any hydrate components of such detergent laundry bar when said bar is subjected to heating at 105° C. for two hours.

4,707,290

GRANULAR ADSORBENT

Wolfgang Seiter, Neuss, and Otto Koch, Leichlingen, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Dec. 9, 1985, Ser. No. 807,065

Claims priority, application Fed. Rep. of Germany, Dec. 10, 1984, 3444960

Int. Cl.[4] C11D *17/06*

U.S. Cl. 252—140 17 Claims

1. A spray-dried granular adsorbent having a high uptake capacity for liquid ingredients of detergents and cleaning preparations consisting of:

(a) 60 to 80 wt. % of a cation-exchanging, synthetic aluminosilicate selected from the group consisting of zeolite A, zeolite X, and mixtures thereof, said aluminosilicate containing water of hydration:

(b) 0.05 to 3 wt. % of sodium silicate having a Na_2O to SiO_2 mole ratio within the range of about 1:2 to about 1:3:5;

(c) 3 to 15 wt. % of a polymeric constituent consisting of a homopolymer of a monomer selected from the group consisting of acrylic acid, methacrylic acid and maleic acid; or a copolymer made by polymerizing a mixture containing at least one of said monomers, said polymeric constituent having a molecular weight of from about 1,000 to about 150,000,

(d) 8 to 18 wt. % of water removable at a temperature of about 145° C., and,

(e) up to about 5 wt. % of a nonionic surfactant,

said adsorbent having particles with an average particle size within the range of about 0.2 to 1.2 mm and having a bulk density in the range of about 400 to 700 g/l.

4,707,291

ENZYMATIC DETERGENT COMPOSITION

David Thom, Voorburg; Ton Swarthoff, Hellevoetsluis, and Jan Maat, Monster, all of Netherlands, assignors to Lever Brothers Company, New York, N.Y.

Filed Jun. 3, 1986, Ser. No. 870,252

Claims priority, application United Kingdom, Jun. 11, 1985, 8514707

Int. Cl.[4] C11D *3/386, 7/42*

U.S. Cl. 252—174.12 3 Claims

1. A detergent composition comprising from 1 to 30% of a mixture of an anionic and a nonionic detergent-active compound in the weight ratio from 12:1 to 1:12, and an enzyme, wherein the enzyme is a lipase which is produced by the microorganisms selected from the group consisting of *Pseudomonas fluorescens, Pseudomonas gladioli* and *Chromobacter viscosum,* said composition containing the lipase in such an amount that the final composition has a lipolytic enzyme activity of from 0.005 to 100 Lipase Units per milligram.

4,707,292

DETERGENT COMPOSITION

Tomohiko Sano, Funabashi; Noriyoshi Fujisawa, Sakura; Masataka Fukuda, Funabashi, and Tsuyoshi Suganuma, Ichikawa, all of Japan, assignors to Kao Corporation, Tokyo, Japan

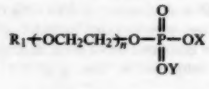
Filed Mar. 21, 1986, Ser. No. 842,334

Claims priority, application Japan, Apr. 3, 1985, 60-70581

Int. Cl.[4] C11D *3/06*

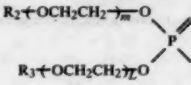
U.S. Cl. 252—174.16 11 Claims

1. A detergent composition which comprises (A) 10 parts by weight of a phosphoric acid ester of the formula (I) or (II):



(I)

-continued



(II)

in which R_1, R_2 and R_3 each are a saturated or unsaturated hydrocarbon group having 8 to 18 carbon atoms, X and Y each are hydrogen, an alkali metal, ammonium or an alkanolamine having 2 or 3 carbon atoms and n, m and L each are zero or an integer of 1 to 10,

(B) 0.001 to 10 parts by weight of a water-insoluble metal salt of a surface active agent, with the proviso that said metal is not an alkali metal, and

(C) 0.01 to 10 parts by weight of a superfatting agent selected from the group consisting of higher fatty acids having 8 to 24 carbon atoms and mixtures thereof, higher alcohols having 8 to 24 carbon atoms and mixtures thereof, hydrocarbons, propylene glycol lecithin, derivatives of lecithin, lanolin and derivatives of lanolin.

4,707,293

DETERGENT COMPOSITION

Antonio Ferro, Lugano Svizzera, Italy, assignor to Crinos International, Lugano, Switzerland

Continuation of Ser. No. 709,508, Mar. 8, 1985, abandoned, which is a continuation-in-part of Ser. No. 628,149, Jul. 5, 1984, abandoned. This application Oct. 8, 1986, Ser. No. 917,293

Claims priority, application Italy, Mar. 5, 1984, 19898 A/84; Feb. 13, 1985, 19490 A/85

Int. Cl.[4] C11D *3/22*

U.S. Cl. 252—174.17 21 Claims

1. A detergent composition for cleaning hair and skin, consisting essentially of a major amount of an oleaginous material selected from the group of animal, vegetable, mineral and synthetic oils and mixtures thereof, 2.0 to 20 percent by weight of a mixture of at least two emulsifying agents, one of said agents being 0.05 to 2.0 percent by weight of a saccharose ester; and the optional presence of a hydrating agent, a vitamin and a powdered clay, from 0 percent of the hydrating agent; 0 percent of the vitamin and 0 percent of the powdered clay.

4,707,294

PREPARATION OF ALCOHOLIC HYDROXYLAMINE SOLUTION FROM HYDROXYLAMMONIUM SULFATE

Chempolil T. Mathew, Randolph, and Harry E. Ulmer, Morristown, both of N.J., assignors to Allied Corporation, Morris Township, N.J.

Division of Ser. No. 437,920, Nov. 1, 1982, Pat. No. 4,551,323. This application Sep. 9, 1985, Ser. No. 773,711

Int. Cl.[4] C01B *21/14*

U.S. Cl. 252—182 4 Claims

1. A process comprising the steps of:

(a) reacting an alcoholic solution of a base selected from the group consisting of sodium hydroxide, potassium hydroxide, lithium hydroxide, ammonium hydroxide and the corresponding alkoxide of 1–5 carbons with solid hydroxyammonium sulfate, employing an alcohol of 1–3 carbons, a temperature, a pressure and a time sufficient to produce a liquid phase having at least 50% of the hydroxyamine values of the hydroxylammonium sulfate;

(b) reacting said hydroxylamine values in said liquid phase with an organic reagent; and

(c) separating the solid phase comprising a sulfate salt corresponding to said base from the liquid phase.

2. A process comprising the steps of:

(a) reacting an alcoholic solution of a base selected from the group consisting of sodium hydroxide, potassium hydroxide, lithium hydroxide, ammonium hydroxide, and the corresponding alkoxides of 1–5 carbons with solid hydroxylammonium sulfate, employing an alcohol of 1–3

carbons, a temperature, a pressure and a time sufficient to produce a liquid phase having at least 50% of the hydroxylamine values of the hydroxylammonium sulfate;

(b) separating the solid phase comprising a sulfate salt corresponding to said base from the liquid phase; and

(c) reacting the liquid phase containing hydroxylammonium values with an acid other than sulfuric acid to produce a hydroxylammonium salt other than hydroxylammonium sulfate.

4,707,295

BICYCLOOCTANE DERIVATIVES

Ludwig Pohl, Darmstadt; Bernhard Scheuble, Alsbach; Andreas Wächtler, Griesheim; Reinhard Hittich, Modautal, and Peter Fuss, Mühltal-Traisa, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Fed. Rep. of Germany

Filed Mar. 24, 1986, Ser. No. 843,407

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1985, 3510433

Int. Cl.[4] C09K *19/30;* **C07C** *13/44, 69/753, 69/13, 121/46, 23/32*

U.S. Cl. 252—299.62 **19 Claims**

1. In a liquid crystalline phase comprising at least two liquid crystalline components, the improvement wherein at least one of said components is a bicyclooctane derivative of the formula

$$R^1—A^1—A^2—R^2$$

wherein

R^1 and R^2 independently are each C_{1-12} alkyl, C_{1-10} alkoxy or C_{1-12} alkyl in which one or two non-adjacent CH_2 groups are replaced by CO, —O—CO, —CO—O or —CH=CH—, or one of R^1 and R^2 can also be $—A^3—R^3$,

A^1 is a 1,4-cyclohexylene group which is unsubstituted or substituted in the 2—, 3— position or a combination thereof by F, Cl, Br, CN, C_{1-5}-alkyl, C_{1-5}-alkoxy, or C_{1-5} perfluorinated alkyl,

A^2 is a 1,4-bicyclo(2.2.2)octylene group;

A^3 is —Cy, —Ph, —Cy—Ph or —Ph—Cy,

Cy is 1,4-cyclohexylene or one of the other groups recited for A^1,

Ph is 1,4-phenylene which is unsubstituted, or monosubstitited by F, CH_3, or a combination thereof,

R^3 is C_{1-12} alkyl, C_{1-10} alkoxy or C_{1-12} alkyl wherein one or two non-adjacent CH_2 groups are replaced by CO, O—CO, —CO—O, or —CH=CH—.

19. A bicyclooctane derivative of the formula formula

$$R^1—A^1—A^2—R^2$$

wherein

R^1 and R^2 independently are each C_{1-12} alkyl, C_{1-10} alkoxy or C_{1-12} alkyl in which one or two non-adjacent CH_2 groups are replaced by CO, or —CH=CH—, or one of R^1 and R^2 can also be $—A^3—R^3$,

A^1 is a 1,4-cyclohexylene group which is unsubstituted or substituted in the 2-, 3- position or a combination thereof by F, Cl, Br, CN, C_{1-5}-alkyl, C_{1-5}-alkoxy, or C_{1-5} perflurinated alkyl,

A^2 is a 1,4-bicyclo(2.2.2)octylene group;

A^3 is —Cy, —Ph, —Cy—Ph or —Ph—Cy,

Cy is 1,4-cyclohexylene or one of the other groups recited for A^1,

Ph is 1,4-phenylene which is unsubstituted, or monosubstituted by F, CH_3, or a combination thereof,

R^3 is C_{1-12} alkyl, C_{1-10} alkoxy or C_{1-12} alkyl wherein one or two non-adjacent CH_2 groups are replaced by CO, O-CO, -CO-O, or -CH=CH-.

4,707,296

ALKOXYETHOXYBENZOIC ACID ESTER DERIVATIVES

Shigeru Sugimori, and Yasuyuki Goto, both of Kanagawaken, Japan, assignors to Chisso Corporation, Osaka, Japan

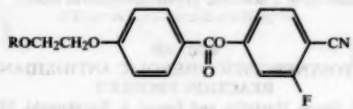
Continuation-in-part of Ser. No. 765,440, Aug. 14, 1985, abandoned. This application Nov. 21, 1986, Ser. No. 933,618

Claims priority, application Japan, Aug. 16, 1984, 59-170733

Int. Cl.[4] C09K *19/20;* **C07C** *121/75*

U.S. Cl. 252—299.67 **5 Claims**

1. A 3-fluoro-4-cyanophenyl 4-(β-alkoxyethoxy)benzoate expressed by the formula



wherein R represents an alkyl group of 1 to 10 carbon atoms.

4,707,297

REMOVABLE GUIDEPATH FOR AUTOMATED GUIDANCE VEHICLES

Richard Paske, Jr.; Michael Pallmer, and William L. King, Jr., all of Holland, Mich., assignors to Bell & Howell Company, Chicago, Ill.

Filed Apr. 29, 1986, Ser. No. 857,729

Int. Cl.[4] C09K *11/06*

U.S. Cl. 252—301.16 **29 Claims**

1. A guidepath composition for detection of emitted radiation by automated guidance vehicles comprising an aqueous dispersion of a sensor-detectable amount of a fluorescent or phosphorescent compound and an effective amount of 5% or less by weight of the aqueous dispersion of a binder including a reversibly crosslinked ionomer.

4,707,298

FLOCCED MINERAL MATERIALS AND WATER-RESISTANT ARTICLES MADE THEREFROM

Thomas M. Tymon, Lancaster, Pa., assignor to Armstrong World Industries, Inc., Lancaster, Pa.

Continuation-in-part of Ser. No. 662,057, Oct. 18, 1984, abandoned. This application Feb. 13, 1986, Ser. No. 829,017

Int. Cl.[4] C04B *20/02, 20/06*

U.S. Cl. 252—378 R **31 Claims**

1. A method of preparing a flocced mineral material that can be utilized to form a non-asbestos high temperature article that exhibits water resistance which method comprises contacting a swelled layer silicate gel having an average charge per structural unit that ranges from about −0.5 to about −1 and which contains exchangeable interstitial ions with at least one species of an exchange cation having the formula $[R^1C(R^2)R^3]+$ wherein R^1, R^2, and R^3 are independently selected from NH_2 and CH_3; provided, however, that at least two or more of R^1, R^2, and R^3 are NH_2 but further providing that one or more of the hydrogen atoms of R^1, R^2, and R^3 may instead be a substituent selected from: a C_1 to C_5 alkyl, a C_2 to C_5 alkenyl and a C_2 to C_5 alkynyl wherein these substituents may be linked to form one or more rings which may be saturated, unsaturated or aromatic; to thereby effect an ion exchange reaction between at least some of the exchangeable interstitial ions, and at least some of the exchange cations; further providing that the swelled layer silicate gel was prepared by contacting, for a sufficient time, a water swelling body of (a) vermiculite, (b) mica, or (c) a mixture of vermiculite and mica with a polar liquid to cause swelling of the crystals accompanied with the formation of a gel.

4,707,299
SOLUTION USEFUL IN MAKING CARBON-METAL PHOSPHATE COMPOSITE

Michael J. Block, Fullerton, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Division of Ser. No. 470,548, Feb. 28, 1983, Pat. No. 4,454,193. This application Jan. 16, 1984, Ser. No. 570,939

Int. Cl.[4] C09K *15/32*

U.S. Cl. 252—400.1 **13 Claims**

1. An impregnating solution useful for preparing a carbon composite having improved resistance to oxidation and a decreased coefficient of friction which comprises a metal salt selected from the group consisting of halide and nitrate metal salts dissolved in a nonionic organophosphorus ester.

4,707,300
AUTOSYNERGISTIC PHENOLIC ANTIOXIDANT REACTION PRODUCT

Budd H. Sturm, Hartville, and Joseph A. Kuczkowski, Monroe Falls, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Mar. 9, 1987, Ser. No. 23,343

Int. Cl.[4] C09K *15/14;* **C08K** *5/13*

U.S. Cl. 252—404 **17 Claims**

1. A stabilized organic composition comprising an oxidizable material and a stabilizing amount of an autosynergistic phenolic antioxidant reaction product, said autosynergistic phenolic antioxidant reaction product is derived from the process comprising:

(1) admixing one mole of a mono-alkylated phenol or a 2,4-dialkylated phenol or a mixture thereof, wherein the alkyl radical may be straight or branched and ranged from 1 to 20 carbon atoms; with

(a) from 0.5 to 1.5 moles of a primary mercaptan of 3–20 carbon atoms; and

(b) from equal molar amount up to 50% molar excess of aqueous formaldehyde based on moles of primary mercaptan when the molar ratio of mercaptan to phenol is 1.0 or greater or equal molar amount up to 100% excess of aqueous formaldehyde when the ratio of mercaptan to phenol is less than 1.0; and

(c) from 0.04 to 20 percent by weight based on the weight of alkylated phenol of an acid catalyst; and

(d) an adequate amount of an azeotroping solvent;

(2) heating the admixture from ambient up to 180° C. while azeotropically removing water until the production of the waters of reaction ceases; and

(3) neutralize the catalyst and isolate the products.

4,707,301
NORBORNYL DIMER ESTER AND POLYESTER ADDITIVES FOR I UBRICANTS AND FUELS

Richard M. Lange, Euclid, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Filed Jul. 11, 1986, Ser. No. 884,573

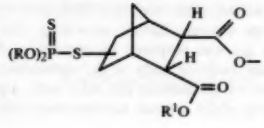
Int. Cl.[4] C10M *137/10, 153/04*

U.S. Cl. 252—46.6 **21 Claims**

1. A dimer ester of the formula:

A—T—A (I)

wherein A is



where R is alky, aryl or aralkyl and R^1 is, independently hydrogen or hydrocarbyl and T is hydrocarbyl.

16. A lubricating composition comprising a major amount of a lubricating oil of lubricating viscosity and a minor effective amount of at least one dimer ester and/or polyester of any one of claims 1 to 15.

4,707,302
2-SUBSTITUTED 4,4,7,7-TETRAMETHYL-1,3-DIOXACYCLOHEPTANES, PREPARATION AND USE THEREOF AS SCENTS

Walter Gramlich, Edingen-Neckarhausen, and Hardo Siegel, Speyer, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

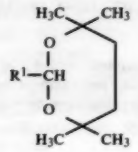
Filed Feb. 3, 1987, Ser. No. 10,420

Claims priority, application Fed. Rep. of Germany, Feb. 6, 1986, 3603661

Int. Cl.[4] A61K *7/46;* **C11B** *9/00;* **C07C** *43/18*

U.S. Cl. 512—11 **5 Claims**

1. A 2-substituted 4,4,7,7-tetramethyl-1,3-dioxacycloheptane of the general formula I

 (I)

where R^1 is a straight-chain or branched alkyl of 1 to 10 carbon atoms which additionally may contain oxygen in the form of an ether group or is 5- to 8-membered cycloalkyl of up to 10 carbon atoms which may additionally contain oxygen in the form of an ether group.

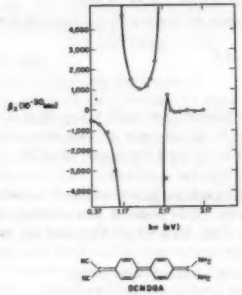
4,707,303
HIGH PERFORMANCE NONLINEAR OPTICAL SUBSTRATES

Alan Buckley, Berkeley Heights; Eui W. Choe, Randolph; Dagobert E. Stuetz, Watchung, all of N.J., and Anthony F. Garito, Radnor, Pa., assignors to Celanese Corporation, New York, N.Y.

Filed Jun. 25, 1985, Ser. No. 748,617

Int. Cl.[4] G02F *1/00;* **H01S** *3/10;* **G02B** *5/20, 26/00*

U.S. Cl. 252—583 **13 Claims**



3. A nonlinear optical organic substrate exhibiting $a\chi^{(2)}$ susceptibility of at least about 3×10^{-6} e.s.u., an absence of interfering fluorescence in the wavelength range between about 0.3–3 μm, an optical loss less than about 0.1 decibel per kilometer, a response time less than about 10^{-13} second, phase

matching of fundamental and second harmonic frequencies, and a dielectric constant less than about 5.

4,707,304

COMPOSITION FOR IMPARTING FIRE-RESISTANCE TO LAMINATING INTERLAYERS

I. Luis Gomez, Longmeadow, Mass., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 23, 1985, Ser. No. 812,493

Int. Cl.[4] C09K *21/00;* **C09D** *5/16, 5/18;* **B27N** *9/00*

U.S. Cl. 252—609 **10 Claims**

6. A composition for imparting fire-resistance to optically clear laminating interlayers comprising:

(a) a plasticizer blend of organic phosphate and organic phosphite constituents wherein the organic phosphate is the major constituent, said organic phosphite being oxidizable to organic phosphate by consumption of oxygen during combustion, said organic phosphite selected from the group consisting of tri-isopropyl phosphite, tri-decyl phosphite, tri-isodecyl phosphite, didecyl(aryl)phosphite, tri-nonylphenyl phosphite, tri-isooctyl phosphite and mixtures thereof;

(b) fumed silica; and

(c) a heat reactive bonding resin.

4,707,305

NAPHTHOQUINODIMETHANE COMPOSITIONS

Eui W. Choe, Randolph; Alan Buckley, Berkeley Heights, both of N.J., and Anthony F. Garito, Radnor, Pa., assignors to Celanese Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 748,583, Jun. 25, 1985, Pat. No. 4,640,800. This application May 19, 1986, Ser. No. 864,203

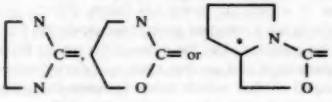
Int. Cl.[4] C07C *50/14*

U.S. Cl. 260—396 N **11 Claims**

1. A naphthoquinodimethane composition corresponding to the formula:

where R and R^1 are substituents selected from hydrogen and aliphatic, alicyclic and aromatic groups containing between about 1–20 carbon atoms, and at least one of the R substituents is an electron-donating group, or the group

is



and at least one of the R^1 substituents is a cyano group.

4,707,306

ALPHA-AMINOMETHYLENE PHOSPHONATE BETAINES AND POLYMERS PREPARED THEREWITH

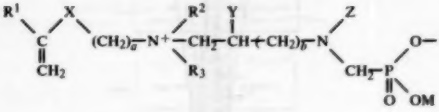
John C. Leighton, Flanders, and Carmine P. Iovine, Bridgewater, both of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Dec. 11, 1986, Ser. No. 940,701

Int. Cl.[4] C07F *9/38*

U.S. Cl. 260—501.12 **4 Claims**

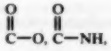
1. Alpha-aminomethylene phosphonate betaine monomers of the formula:



where

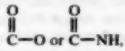
R^1 is hydrogen or methyl;

X is



or CH_2;

a is 0, 1, 2, or 3, with the condition that when X is



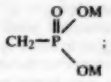
that a be greater than 1;

R^2 and R^3 are independently C_1–C_6 alkyl, aryl, benzyl, or cyclohexyl;

Y is hydrogen or hydroxyl;

b is 0, 1, 2, or 3;

Z is C_1–C_6 alkyl, aryl, benzyl, cyclohexyl or



and

M is hydrogen, metallic cation, or ammonium ion.

4,707,307

GRANULAR MAGNESIUM SALTS

Denis A. Hutton, Sale, and Malcolm H. Millar, Widnes, both of England, assignors to Interox Chemicals Ltd., London, England

Division of Ser. No. 410,988, Aug. 24, 1982, Pat. No. 4,567,010. This application Aug. 2, 1985, Ser. No. 761,837

Claims priority, application United Kingdom, Sep. 8, 1981, 8127157

Int. Cl.[4] C07C *179/133*

U.S. Cl. 260—502 R **4 Claims**

1. Granular magnesium monoperoxyphthalate, having a particle size of from 0.15 to 1.0 mm. being attrition resistant, having a free-flowing bulk density of from 0.3 to 0.6 kg/l, and having a solubility in water of at least 70% by weight, said solubility being calculated by comparing dissolved available oxygen with the known available oxygen of the granular material, said dissolved oxygen content being determined by stirring 0.25 grams of the granular salt in 25 ml. of water at 20° C. in a centrifuge tube for 15 seconds, centrifuging for 30 seconds, decanting the supernatant liquid, and determining the available oxygen content of the supernatant liquid.

4,707,308

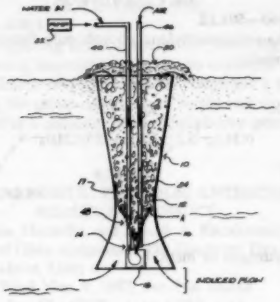
APPARATUS FOR CIRCULATING WATER

Ronald W. Ryall, 673 Ascot St., Vista, Calif. 92083

Filed Nov. 28, 1983, Ser. No. 554,955

Int. Cl.[4] B01F *3/04*

U.S. Cl. 261—77 **6 Claims**



1. Apparatus for circulating water within a body of water, comprising:

inductor means having an inlet and an outlet and wall means defining between said inlet and outlet a restricted segment, said inductor means being submerged in the body of the water with the inlet below the surface of the water; aspirator means disposed below the restricted segment at the inlet of the inductor means and centrally positioned and spaced from the wall means, said aspirator means having a water inlet, a gas inlet in communication with the atmosphere, and an outlet, said water inlet, air inlet, and outlet of the aspirator means being disposed below the restricted segment, pump means connected to the water inlet of the aspirator means for pumping water from the body of water into the aspirator means through said water inlet, so air is drawn into the air inlet and a mixture of atmospheric gas and water flows from the aspirator outlet upwardly towards the restricted segment, with said mixture of atmospheric gas and water being in the form of a confined cone which at a predetermined point from the outlet of the aspirator means begins to break apart; said aspirator means being positioned relative to the restricted segment so that the point where the cone begins to break apart is at or near the restricted segment, and the cross-sectional area of the cone taken at a right angle through the longitudinal axis of the cone at the point where the cone begins to break apart approximately equals the cross-sectional area of the restricted segment.

4,707,309

DOTTING OF MOLDING TOOLS WITH DROPLETS

Gunther M. Voss, Diessen; Volker I. Gläsel, Biberach; Peter Gruber, Biberach, and Walter Bubeck, Biberach, all of Fed. Rep. of Germany, assignors to Dr. Karl Thomae GmbH, Biberach an der Riss, Fed. Rep. of Germany

Filed Mar. 27, 1984, Ser. No. 593,978

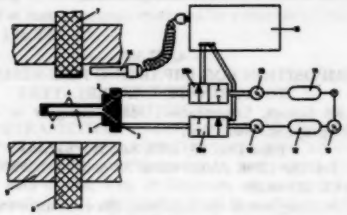
Claims priority, application Fed. Rep. of Germany, Apr. 8, 1983, 3312634

Int. Cl.[4] B29C *33/58, 43/58*

U.S. Cl. 264—12 **5 Claims**

1. In a method of preparing shaped articles from granulate material comprising introducing granulate material into a mold die cavity, compressing the granulate material in the mold die with a cooperating punch to form shaped articles, and ejecting the shaped articles from the mold die cavity,

the improvement wherein a lubricant film is formed on mating surfaces of the mold die cavity and cooperating punch by alternately releasing through each of a multitude of single-substance nozzles a defined quantity of lubricant liquid or suspension under pressure and then a defined quantity of gas under pressure, the quantity of gas causing (1) the lubricant liquid or suspension to form droplets of



uniform shaped and size, (2) said droplets to detach from the nozzles, and (3) said droplets to accelerate in a directed manner toward specific zones of the mating surfaces to provide lubrication of the mating surfaces.

4,707,310

METHOD FOR HEAT CONTROL OF HOT RUNNER MOLDS

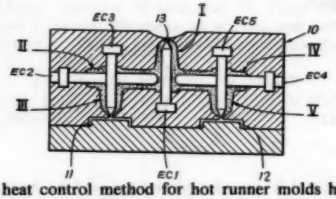
Pierre Debeaud, La-Queue-en-Brie, France, assignor to Albert Denis S.A., Aulnay-sous-Bois, France

Filed May 10, 1985, Ser. No. 732,741

Claims priority, application France, May 16, 1984, 8407602

Int. Cl.[4] B29C *45/27, 45/78*

U.S. Cl. 264—40.6 **5 Claims**



1. A heat control method for hot runner molds having a plurality of heating zones in feed runners of material to be molded, and a temperature control circuit, said method comprising: controlling the electric power applied to a heater element placed in a zone of said plurality of zones as a function of the value of the temperature measured by a thermometric probe placed in the zone, continuously monitoring the functioning of the probe and, upon the probe failing, automatically switching the control circuit to another mode of operation in order to continue supplying electric energy to the corresponding heater element, with a power which is proportional to the supply power of the heater element of another heating zone; said switching step including: applying to the heater element of the zone in which the probe has failed, electric power of a value which has a constant percentage deviation from a reference value constituted by the value of the power applied to the heater element of said another zone, said deviation being maintained equal to that which exists between the values of the powers applied to the heater elements of the two zones in question in equilibrium during normal operation.

4,707,311
METHOD OF MANUFACTURING SILICA-FREE INTERCONNECTED POROUS CERAMICS

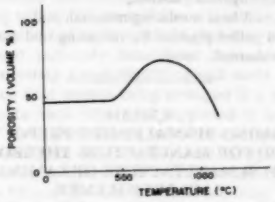
Kiyoshi Okazaki, Yokohama, Japan, assignor to Mitsubishi Mining & Cement Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 215,544, Dec. 11, 1980. This application Aug. 10, 1984, Ser. No. 639,954

Claims priority, application Japan, Dec. 26, 1979, 54-170133; Sep. 16, 1980, 55-128429

Int. Cl.[4] B28B *1/50*

U.S. Cl. 264—43 **8 Claims**



1. A method of manufacturing porous ceramic bodies comprising the steps of:

preparing a powder from a composition of ceramic material a major portion of which is

(a) responsive to a first temperature at which anomolous expansion occurs and in which the material forms interconnected pores, and to a second and higher temperature at which sintering occurs, and in which the material contracts in volume while maintaining the formed interconnected pores, and

(b) in which said ceramic material is selected from the group consisting of lead zirconate titanate, lead titanate, lead zirconate, $PbTa_2O_6$, $Pb_2Fe_2O_5$, $Pb(Ta_{0.5})O_3$, $ZnFe_2O_3$, and combinations thereof.

admixing with said powder a resinous binder, and molding said mixture into a desired shape, and,

applying heat to said molded mixture at a temperature between that at which said anomolous expansion occurs and that at which sintering occurs, for a period of time sufficient to expand said molded mixture in volume and to form interconnected pores therein greater than those desired in the finished body, and thereafter continuing the application of heat at a temperature greater than the temperature at which sintering occurs for a sufficient period of time of contract said molded mixture in volume until a ceramic body having an interconnected porous structures of a selected porosity in the range of 10 to 80 volume percent and uniform pore distribution is obtained.

4,707,312
METHOD FOR PRODUCING CERAMIC ARTICLES OF INCREASED FRACTURE TOUGHNESS

Ram Bajaj, Greensburg, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 9, 1985, Ser. No. 785,811

Int. Cl.[4] C04B *38/00*

U.S. Cl. 264—43 **25 Claims**

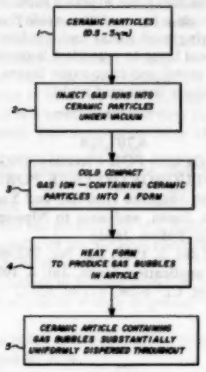
1. A method of producing ceramic articles having improved fracture toughness properties by a powder metallurgical process comprising:

providing a supply of ceramic particles having a particle size of between 0.5–5 micrometers in diameter;

injecting gas ions into the ceramic particles of said supply of particles by impingement therewith of a beam of accelerated said gas ions to produce a supply of gas ion-containing ceramic particles;

cold compacting said gas ion-containing ceramic particles into a form by applying pressure thereabout; and

heating said form at a temperature of at least 800° C., whereby said gas ions form gas bubbles, to produce a


CERAMIC PARTICLES (0.5 - 5 μm)
1
INJECT GAS IONS INTO CERAMIC PARTICLES UNDER VACUUM
2
COLD COMPACT GAS ION — CONTAINING CERAMIC PARTICLES INTO A FORM
3
HEAT FORM TO PRODUCE GAS BUBBLES IN ARTICLE
4
CERAMIC ARTICLE CONTAINING GAS BUBBLES SUBSTANTIALLY UNIFORMLY DISPERSED THROUGHOUT
5

ceramic article having gas bubbles substantially uniformly disposed throughout.

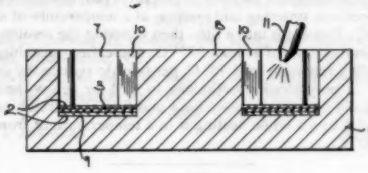
4,707,313
METHOD OF MAKING A LAMINATED STRUCTURE FOR USE IN AN ELECTRICAL APPARATUS

Timothy H. Houle, Wauwatosa, Wis., assignor to A. O. Smith Corporation, Milwaukee, Wis.

Filed Jul. 2, 1986, Ser. No. 881,256

Int. Cl.[4] B05D *5/12;* **B29C** *41/22;* **B32B** *7/10*

U.S. Cl. 264—61 **3 Claims**



1. A method of making a laminated structure for use in an electrical apparatus, comprising the steps of forming a mold cavity having a flat bottom surface and a side wall corresponding to the configuration of the laminated structure, spraying a ferrous metal on said bottom surface to form a flat first metal layer that extends continuously across said bottom surface and has a substantial uniform thickness throughout its surface area, spraying an electric insulating material onto the exposed surface of said first metal layer to completely cover said exposed surface and provide an electrically insulating layer, spraying ferrous metal onto the exposed surface of said insulating layer to provide a second metal layer that completely covers the exposed surface of said insulating layer and maintaining said second metal layer out of electrical contact with said first metal layer, repeating the steps of spraying said metal and said insulating material to form a laminated structure of separate alternate metal and insulating layers of desired thickness, and removing the laminated structure from the mold.

2. A method of making a laminated structure for use in an electrical apparatus, comprising the steps of forming a female mold having a flat bottom surface and a side wall corresponding to the configuration of the laminated structure, spraying ferrous metal on said bottom suface to form a flat first metal layer that completely covers said bottom surface, oxidizing the exposed surface of said first metal layer to provide a layer of iron oxide thereon, spraying ferrous metal onto the exposed

surface of said iron oxide layer to form a second metal layer that completely covers said iron oxide layer and thereby maintains said second metal layer out of electrical contact with said first metal layer, oxidizing the exposed surface of said second metal layer to provide a layer of iron oxide thereon, repeating the steps of spraying said metal and oxidizing the exposed surface of each metal layer to provide a laminated structure of separate alternate metal and iron oxide layers, and removing the laminated structure from said mold.

4,707,314

PROCESS FOR PRODUCING POLYTETRAFLUOROETHYLENE POROUS FILMS

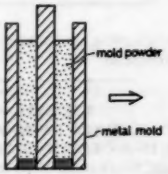
Nobuo Kawahigashi; Shigesou Hashida, and Yasunobu Kojima, all of Kanagawa, Japan, assignors to Nippon Valqua Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 3, 1985, Ser. No. 752,081

Claims priority, application Japan, Jul. 4, 1984, 59-138708

Int. Cl.[4] B29C *67/20, 55/12*

U.S. Cl. 264—127 **5 Claims**



1. A process for producing a polytetrafluoroethylene porous film which comprises the steps of compression molding polytetrafluoroethylene resin molding powders of average particle diameter of from 1 to 900 micrometers obtained by a suspension polymerization method to prepare a polytetrafluoroethylene preform, sintering said preform at a temperature of at least 327° C., forming it into a film, then sintering the resulting film at a temperature of at least 327° C., thereafter quenching it at a cooling rate of at least 70° C. per hour to reduce the crystallinity of polytetrafluoroethylene to 55% or below, and then uniaxially or biaxially stretching said film at a stretch ratio of from 1.3 to 6.5 while heating it to a temperature of from 100° to 320° C.

4,707,315

METHOD OF MAKING A BLOOD PUMP

Yasushi Joh, Yokohama, and Toshio Nagase, Tsukuba, both of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan

Filed May 15, 1985, Ser. No. 734,367

Claims priority, application Japan, May 18, 1984, 59-99825

Int. Cl.[4] B29C *41/18*

U.S. Cl. 264—129 **13 Claims**

1. A method of making a blood pump having a blood chamber surrounded by a tapered wall, said wall therefore being of nonuniform thickness, comprising the steps of:

putting a cover onto a cuplike mold in a liquid-tight manner, said cover being provided with an inlet conduit portion for introducing blood and an outlet portion for pumping out of the blood;

covering at least a part of the outer surface of said mold with a non-metallic heat insulating material to control heat conduction through said part of the outer surface of said mold;

pouring a plastisol of polyvinyl chloride into said mold to the level that said plastisol comes into contact with said cover;

heating said mold from the exterior thereof so that a portion of said plastisol is gelled;

discharging ungelled plastisol;

removing said heat insulating material; and

curing said gelled plastisol by reheating said mold from the exterior thereof.

4,707,316

POLYAMINO-BIS-MALEIMIDE PREPOLYMER, METHOD FOR MANUFACTURE THEREOF, AND METHOD FOR MANUFACTURE OF LAMINATE USING SAID PREPOLYMER

Atsushi Fujioka; Yasuo Miyadera, and Tomio Fukuda, all of Shimodate, Japan, assignors to Hitachi Chemical Company, Ltd., Tokyo, Japan

Division of Ser. No. 650,905, Sep. 13, 1984, Pat. No. 4,598,115. This application Apr. 10, 1986, Ser. No. 850,122

Claims priority, application Japan, Sep. 14, 1983, 58-170240; Sep. 29, 1983, 58-181575

Int. Cl.[4] B32B *31/12*

U.S. Cl. 264—135 **6 Claims**

1. A method for the manufacture of a laminate of polyamino-bis-maleimide resin, which comprises impregnating a plurality of substrates with a polyamino-bis-maleimide prepolymer solution, obtained by the reaction of 1 mol of N,N'-4,4'-diphenylmethane-bis-maleimide with 0.25 to 0.4 mol of 4,4'-diaminodiphenylmethane in an alkyleneglycol monoalkyl ether as a solvent at an elevated temperature, drying the resultant web substrates thereby expelling the solvent therefrom, superimposing a plurality of the resultant prepregs to produce a composite, and subjecting the resultant composite to heat and pressure.

4,707,317

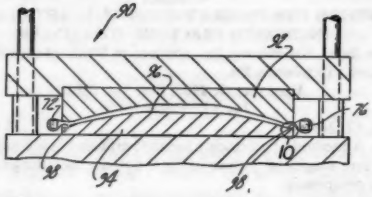
METHOD OF MAKING LEAF SPRING

Joseph N. Epel, 22559 Bellbrook, Southfield, Mich. 48034; John J. Morse, III, 742 LaBrosse, Rochester, Mich. 48063, and Terry N. Trebilcock, 14615 Burns, Southgate, Mich. 48195

Continuation of Ser. No. 578,920, Apr. 23, 1984, abandoned, which is a division of Ser. No. 273,787, Jun. 15, 1981, abandoned. This application Feb. 28, 1986, Ser. No. 835,086

Int. Cl.[4] B29B *15/10;* **B29C** *43/18*

U.S. Cl. 264—136 **1 Claim**



1. The method of making a leaf spring of varying width comprising the step of:

(a) providing sources of a continuous glass fiber strand, a vat containing liquid resin and a rectangular winding frame having side members joined by transverse end members;

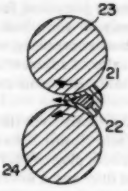
(b) providing biasing between said end members normally causing said end members to move away from each other;
(c) moving said end members towards each other to overcome said biasing;
(d) clamping said end members in fixed positions;
(e) pulling said glass fiber strands through said vat to coat said strand with resin as it is wound on said winding frame to provide elongated glass fiber strands thereon;
(f) releasing said clamping after said winding operation;
(g) providing a mold having two pieces disposed to be closed under pressure and forming an elongated cavity therebetween conforming to the shape of said leaf spring;
(h) placing said strands on said frame in said elongated cavity formed in said mold with said glass fiber strands being distributed uniformly throughout transverse cross-sections extending longitudinally of said mold cavity with said glass fiber strands being arranged in a parallel relationship to each other and supported in a pattern no greater than the maximum width of said spring prior to placing said glass fiber strands in said cavity of said mold;
(i) maintaining said mold at a temperature of about 300 degrees fahrenheit while said resin is curing;
(j) pressing the length of glass fiber strands between said two pieces of said mold until said resin is cured;
(k) maintaining said glass fiber stands under tension during said pressing by said biasing; and
(l) providing dams in one of said two pieces on opposite ends and transverse to said elongated cavity to prevent resin from escaping from said cavity when said two pieces are closed to assure that said cavity is completely filled with resin.

4,707,318

METHOD FOR MANUFACTURING A SWAB

Tran D. Can, 23, Avenue Niel, 75017 Paris, France

Continuation-in-part of Ser. No. 474,184, Mar. 10, 1983, abandoned. This application Apr. 19, 1985, Ser. No. 725,118
Claims priority, application France, Mar. 12, 1982, 82 04167; Aug. 13, 1982, 82 14139
Int. Cl.[4] B29C *43/18*
U.S. Cl. 264—138 **21 Claims**



1. A method of making swabs including an elongate stem having ends and at least one wad of absorbent material supported on a respective end of the stem, comprising the steps of:
forming the stem of a deformable material;
providing the wad of absorbent material on a respective end of the stem to form a wad-stem assembly portion; and
subjecting the wad-stem assembly portion to a pressure deformation to impart an external non-circular transverse cross-sectional configuration to both the wad and said respective end of the stem.

4,707,319

PROCESS FOR PRODUCTION OF YARNS AND FIBERS WITH GOOD PROPERTIES, BASED ON ATACTIC POLYVINYL CHLORIDE

Georges Achard, Décines; Gilbert Anouilh, Lyon, and Jacques Menault, Charbonnieres-Les-Bains, all of France, assignors to RHOVYL, Neuilly-sur-Seine, France

Continuation of Ser. No. 654,176, Sep. 25, 1984, abandoned, which is a division of Ser. No. 522,746, Aug. 12, 1983, Pat. No. 4,508,778, which is a continuation of Ser. No. 328,522, Dec. 8, 1981, abandoned. This application May 23, 1986, Ser. No. 870,303
Claims priority, application France, Dec. 8, 1980, 80 26046
Int. Cl.[4] D02G *1/00*
U.S. Cl. 264—168 **6 Claims**

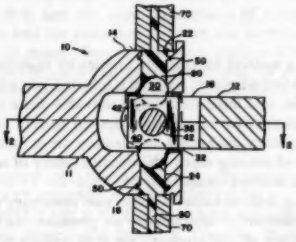
1. A process for the production of a filament, yarn or a fiber consisting essentially of atactic polyvinyl chloride and having the following characteristics;
a residual shrinkage in boiling water of less than 3%,
a modulus of elasticity which is greater than or equal to 2 kN/mm^2,
an orientation index of the crystalline zones which is greater than or equal to 70%,
an orientation index of the mesomorphic zones which is greater than or equal to 8%, and
an orientation index of the amorphous zones which is greater than or equal to 5%,
said process being characterized in that, after dry spinning from a solution consisting essentially of atactic polyvinyl chloride the filaments are continuously stretched in boiling water at a ratio of between 3 and 6X, stabilised continuously under tension at a temperature between 105° and 130° C., in the presence of steam under pressure, for 1 to 3 seconds, and then continuously shrunk in an aqueous fluid medium at a temperature between 98° and 130° C.

4,707,320

METHOD OF INJECTING MOLDING A UNIVERSAL JOINT

William E. Sherman, II, Granger, Ind., assignor to Allied Corporation, Morristown, N.J.

Division of Ser. No. 643,599, Aug. 23, 1984, Pat. No. 4,582,503. This application Apr. 10, 1986, Ser. No. 850,194
Int. Cl.[4] B29C *45/14*
U.S. Cl. 264—242 **6 Claims**



1. A method for providing a lash-free universal joint, comprising the steps of (a) providing two rotatable members each having spaced-apart arms located at an end of the respective rotatable member, each arm having a through opening, (b) press fitting a ball into each of the openings such that the ball protrudes radially inwardly fromthe through opening of the respective spaced-apart arm, (c) disposing means for coupling the rotatable members together between the spaced-apart arms of each rotatable member, the coupling means having a plurality of seats each of which receives a protruding ball, (d) injection molding plastic material within the openings of a pair of spaced-apart arms of one rotatable member so that the coupling means is centered between the associated balls and

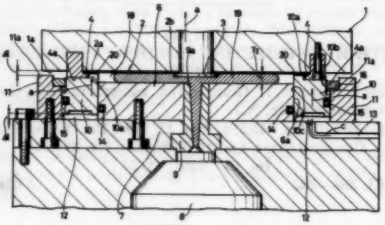
spaced-apart arms and accurately positioned therebetween, the plastic material injected by means of nozzles that engage the pair of spaced-apart arms of the one rotatable member and the nozzles moving inward to effect a preloading of the respective arms which effects the positioning of the coupling means, and (e) injection molding plastic material into the openings of the spaced-apart arms of the other rotatable member so that the associated balls and coupling means are centered relative to the spaced-apart arms of the other rotatable member and the coupling means accurately positioned therebetween, the plastic material injected by means of nozzles which engage the pair of spaced-apart arms of the other rotatable member and the nozzles moving inward to effect a preloading of the respective arms which effects the positioning of the coupling means, the coupling means being centered between the spaced-apart arms of the rotatable members and the balls positioned by the plastic material and engaging the seats to provide lash-free movement in any direction.

4,707,321

METHOD FOR FORMING ARTICLES BY INJECTION MOLDING

Takashi Segawa, Kanagawa, and Kunio Tsuboi, Saitama, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Oct. 17, 1985, Ser. No. 788,740
Claims priority, application Japan, Oct. 18, 1984, 59-218824
Int. Cl.[4] B29C *43/04, 45/04*
U.S. Cl. 264—294 **4 Claims**



1. In a method for forming articles by injection molding in which a melted plastic material is injected into a cavity defined in a mold, said mold including a movable die, a stationary die, and a stamper for imparting a desired pattern to said article, said stationary die having an auxiliary die in contact with and capable of moving along an outer periphery of said stationary die, said method comprising the steps of:

closing said movable die onto said stationary die under the condition of substantially no pressure, such that a first portion of said auxiliary die is in contact with said movable die and a gap exists between said movable die and a second portion of said auxiliary die;

injecting said melted plastic material into said cavity, and thereby slightly releasing away said movable die from said stationary die by the pressure of the injected melted plastic material while moving said auxiliary die along said outer periphery to maintain said first portion of said auxiliary die in contact with said stationary die when said melted plastic material is injected; and

pressing said movable die against said stationary die during injection or after injection to press mold said melted plastic material in said cavity while exhausting gas from said cavity through said gap.

4,707,322

BERYLLIUM-7 LABELED CARBON PARTICLES AND METHOD OF MAKING

Powell Richards, New Bern, N.C.; Leonard F. Mausner, Stony Brook, and Thomas F. Prach, Port Jefferson, both of N.Y., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 29, 1985, Ser. No. 728,359
Int. Cl.[4] G21G *1/10, 4/00*; C09K *11/00, 11/04*
U.S. Cl. 376—194 **6 Claims**

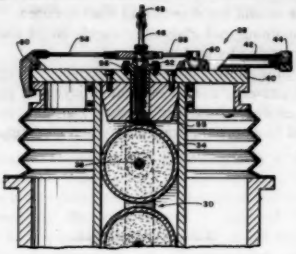
1. Beryllium-7 labeled solid carbon particles produced by proton nuclear reaction at energies in excess of 50 MeV wherein the beryllium-7 formed by said proton nuclear reaction is trapped in the lattice structure of the carbon.

4,707,323

DUCT CLOSURE

Kennison L. Vowell, Canoga Park, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 10, 1985, Ser. No. 786,414
Int. Cl.[4] G21C *13/06*
U.S. Cl. 376—203 **13 Claims**



1. A closure for an inclined duct having an open upper end and defining a downwardly extending passageway comprising:

cap means for sealing engagement with said open upper end of said duct;

an array of vertically aligned plug members each having a cross-sectional area substantially conforming to the cross-sectional area of said passageway at least adjacent an upper end thereof and being freely movable therein, each of said plug members comprising a cylinder each cylinder having a longitudinally-extending axle at each end;

means interconnecting each of said vertically aligned plug members, said means providing for free movement of said plug members only in the plane in which said duct is inclined, said means comprising a plurality of end plates interconnecting axles of adjacent cylinders;

means connecting said cap means to the uppermost plug of said array and;

hoist means located directly over the open upper end of said duct for moving said closure between an upper position at which said lowermost plug of said array is above the open upper end of said duct and a lower position at which said cap means is in engagement with the open upper end of said duct.

9. In a liquid metal cooled fast breeder reactor, a closure for an inclined fuel transfer duct, said duct having an open upper end and defining a downwardly extending substantially rectangular passageway comprising:

cap means for sealing engagement with said open upper end of said duct;

an array of vertically aligned plug members each having a substantially rectangular cross-sectional area conforming to the cross-sectional area of the passageway, at least adjacent an upper end thereof and being freely movable therein, each of said plug members comprising a cylinder,

each cylinder having a longitudinally extending axle at each end;

means interconnecting each of said vertically aligned plug members, said means providing for free movement of said plug members only in the plane in which said duct is inclined, said means comprising a plurality of end plates interconnecting axles of adjacent cylinders;

means connecting said cap means to the uppermost plug of said array;

hoist means located directly over the upper end of said duct for moving said closure between an upper position at which said lowermost plug of said array is above the open upper end of said duct, and a lower position at which said cap means is in engagement with the open upper end of said duct; and

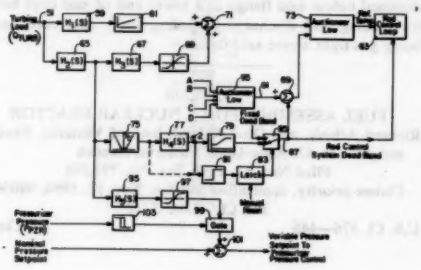
means associated with said cap means for guiding at least a lower portion of said array of said vertically aligned plug members into the open upper end of said duct.

4,707,324

CONTROLLING THE RESPONSE OF A PRESSURIZED WATER REACTOR TO RAPID FLUCTUATIONS IN LOAD

Gary D. Storrick, Peters Township, Washington County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 27, 1984, Ser. No. 686,768
Int. Cl.[4] G21C *7/00*
U.S. Cl. 376—215 **31 Claims**



1. Apparatus for controlling the response to a load signal of a pressurized water reactor having a plurality of controlled process variables, said apparatus comprising:

a control system for effecting control actions to regulate a selected process variable to a value called for by a setpoint reference signal; and

means responsive only to rapid fluctuations in said load signal above a predetermined frequency for adjusting the value of said setpoint reference signal by an amount which substantially matches the variation in the value of the selected process variable expected as a result of said rapid fluctuations in the load signal without control action, and taking into account any time delay in the affect of the rapid fluctuations on the selected process variable, whereby control actions effected by said control system are substantially reduced.

4,707,325

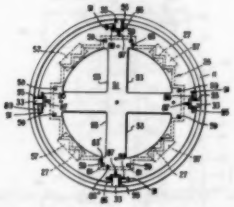
GAUGE PLATE FOR USE IN CUSTOMIZING A REPLACEMENT UPPER CORE PLATE IN A NUCLEAR REACTOR, AND METHOD OF USING THE GAUGE PLATE

Ronald J. Hopkins, Pensacola, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 3, 1986, Ser. No. 881,997
Int. Cl.[4] G21C *17/00*
U.S. Cl. 376—245 **18 Claims**

1. A gauge plate for use in customizing replacement upper core plate inserts of a nuclear reactor of the type including a pressure vessel, a core barrel disposed within the pressure vessel, a lower internal structure disposed in the core barrel and including a baffle plate arrangement, and an upper internals structural package having an upper core plate at its lower end, with the upper core palte being provided with a plurality of peripheral grooves which each contain an insert machined to close tolerances for engaging respective approximately rectangular shaped guide pins extending radially inwardly from the inner surface of the core barrel for aligning the upper internals structural package relative to the lower internal structure, said gauge plate comprising:

a circular metal plate of a known diameter corresponding substantially to that of the upper core plate of the nuclear reactor to be gauged; a plurality of U-shaped gauging slots formed in the peripheral surface of said gauge plate and extending between its major surfaces, said gauging slots being formed at locations corresponding to the respective locations of the radially inwardly directed guide pins of the reactor to be gauged and being of a known size suffi-



cient to receive the respective guide pins with clearance on all sides; first means for positioning said gauge plate within the nuclear reactor vessel to be gauged, while it contains a baffle plate arrangement but not the upper internals structural package, at the normal elevation of the upper core plate inserts and the guide pins; second means, disposed on said gauge plate, for positioning said gauge plate relative to the baffle plate arrangement of the reactor to be gauged; gauge means in said gauge plate for determining the actual position of the gauge plate relative to the baffle plate arrangement; and remotely controlled measuring means, disposed on said gauge plate, for measuring the clearances between each of said U-shaped gauging slots and the adjacent surfaces of a respective guide pin and the clearance between the peripheral surface of said gauge plate and the inner surface of the core barrel adjacent each said gauging slot, and for providing an indication of the measured clearances at a remote location.

4,707,326

ARRANGEMENT AND METHOD FOR ATTACHING AND REATTACHING A TOP NOZZLE IN A RECONSTITUTABLE NUCLEAR FUEL ASSEMBLY

John F. Wilson, Murrysville; Robert K. Gjertsen, Monroeville, and Joseph B. Mayers, Greensburg, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 26, 1985, Ser. No. 759,382
Int. Cl.[4] G21C *19/00, 3/32*
U.S. Cl. 376—261 **8 Claims**

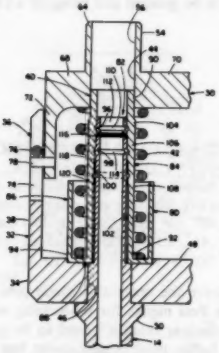
1. In a reconstitutable fuel assembly having at least one control rod guide thimble and a top nozzle, said guide thimble including an upper end portion, said top nozzle including a lower adapter plate and an upper hold-down plate, said lower and upper plates having respectively an opening and passageway defined therethrough and aligned with one another, said opening in said lower plate receiving said guide thimble therethrough with its upper end portion extending above said lower plate and toward said passageway of said upper plate, an im-

proved arrangement for mounting said top nozzle on said guide thimble, comprising:

(a) alignment means extending between said plates and receiving said guide thimble upper end portion, said means at an upper end being inserted into said passageway of said upper hold-down plate and at a lower end resting on said adapter plate; and

(b) complementary means formed on and interconnecting said alignment means and said guide thimble upper end portion so as to connect said alignment means and said guide thimble together, said complementary means including a primary interior annular groove formed on said alignment means and a primary exterior bulge formed on said guide thimble upper end portion and extending into said primary annular groove;

(c) said complementary means further including a secondary interior annular groove formed on said alignment means at a location spaced below said primary annular groove, said



secondary groove adapted to receive a secondary exterior bulge, being formed on said guide thimble upper end portion after severance of an upper segment of said guide thimble upper end portion containing said primary bulge followed by removal and receipt of said severed guide thimble upper end portion from and back in said alignment means, for reconnection of said alignment means and said severed guide thimble together;

(d) said complementary means still further including a primary interior section on said alignment means which contains said primary annular groove and a secondary interior section on said alignment means which contains said secondary annular groove, said secondary section being disposed below said primary section and having an interior diameter larger than that of said primary section for facilitating receiving of said severed guide thimble upper end portion back into said alignment means for reconnection of said alignment means and said severed guide thimble together.

4,707,327

CONTAINER SYSTEM FOR A HIGH-TEMPERATURE NUCLEAR REACTOR

Herbert Reutler, Cologne, and Manfred Ullrich, Bergisch-Gladbach, both of Fed. Rep. of Germany, assignors to Interatom GmbH, Bergisch-Gladbach, Fed. Rep. of Germany

Filed Dec. 14, 1984, Ser. No. 681,544

Claims priority, application Fed. Rep. of Germany, Dec. 15, 1983, 3345457

Int. Cl.[4] G21C *13/02*

U.S. Cl. 376—294 **1 Claim**

1. Container system for a high-temperature nuclear reactor, comprising an outer metallic pressure vessel having an inwardly-protruding flange, an inner metallic core barrel resting tightly on said flange, said core barrel being disposed at a distance from said pressure vessel defining a space therebetween, said flange dividing said space into upper and lower spaces, an equalization line connected between said upper and lower spaces, means for shutting off said line, another equalization line leading from the lower end to the upper end of said

core barrel interconnecting said upper and lower spaces, a rupture disc protector closing off said other line, and means disposed below said flange at a lower end of said core barrel for feeding and discharging cooling fluid, said core barrel being gas-tight above said flange.

4,707,328

FUEL ASSEMBLY FOR A NUCLEAR REACTOR

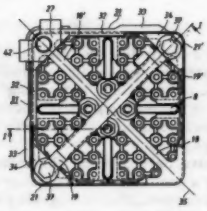
Richard Arbink, and Olov Nylund, both of Västerås, Sweden, assignors to AB Asea-Atom, Västerås, Sweden

Filed Nov. 12, 1985, Ser. No. 797,298

Claims priority, application Sweden, Nov. 12, 1984, 8405640

Int. Cl.[4] G21C *3/32*

U.S. Cl. 376—446 **8 Claims**



1. A fuel assembly comprising a plurality of fuel rods, a fuel channel having a first corner, a bottom tie plate means, a bottom part formed with a downwardlyfacing inlet opening for coolant, a spacer with a corner portion and two arms substantially at right angles extending from said corner portion, and lifting means surrounded by said fuel channel and provided with a lifting handle, said fuel rods being surrounded by said fuel channel and supported by said bottom tie plate means which in turn is supported by said bottom part, said lifting means being arranged in a tensile force-transmitting connection with said bottom tie plate means, said spacer being arranged with said corner portion at said first corner of said fuel channel and with each of said arms extending along a respective outer side of said fuel channel, said fuel channel being fixed to said bottom part and mechanical connections between said spacer and said lifting means and between said spacer and said fuel channel being provided by means of two radially extending projections, each of which is attached to and extends

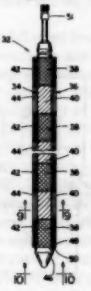
diagonally away from a corresponding one of said arms and passes through at least one corresponding aperture in a wall of the fuel channel to provide a tensile force-transmitting mechanical connection with said fuel channel, each projection extending diagonally away from its corresponding arm in a direction parallel to an imaginary, axially extending plane passing diagonally through said first corner of the fuel channel and being positioned for the most part inside the inner limiting surface of the fuel channel, said projections being fixed to said lifting means by means of a detachable mechanical connection means which is releasable from above the fuel assembly, and said spacer being detachable from said fuel channel by release of said detachable mechanical connection means and radial movement of said spacer relative to said fuel channel to withdraw said projections from said apertures.

4,707,329

NUCLEAR REACTOR CONTROL ROD WITH UNIFORMLY CHANGEABLE AXIAL WORTH

Thomas R. Freeman, Greensburg, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 7, 1986, Ser. No. 816,780
Int. Cl.[4] G21C 3/32, 7/10
U.S. Cl. 376—449 **7 Claims**



1. In combination with a fuel assembly having at least one hollow guide thimble, means to compensate for a reduction in reactivity occurring generally uniformly in a transverse direction and symmetric in the axial direction, comprising.

(a) a control rod inserted in said guide thimble, said control rod including

(i) an elongated inner cylindrical member having a lower end,

(ii) an elongated outer cylindrical member surrounding said inner member and having a lower end with concentrically-arranged lower inner and outer edge portions defined thereon,

(iii) each of said members being composed of alternating poison and nonpoison regions,

(iv) said inner member being axially movable relative to said outer member,

(v) an outwardly projecting ledge defined on said lower end of said inner member and adapted to support in a rest relationship thereon said lower end of said outer member at its lower inner edge portion for retaining said outer member about said inner member; and

(b) means for retaining said outer member in a stationary position in said guide thimble while said inner member is movable axially relative thereto to adjust the degree to which said poison regions of said members overlap with said nonpoison regions thereof and thereby change the overall worth of said rod;

(c) said retaining means being dispsed in a lower portion of said guide thimble and sized to support said lower end of said outer member at its lower outer edge portion, said retaining means having a central hole sized to allow passage of said lower end and ledge of said inner member therethrough.

4,707,330

ZIRCONIUM METAL MATRIX-SILICON CARBIDE COMPOSITE NUCLEAR REACTOR COMPONENTS

Harry M. Ferrari, Edgewood Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 8, 1985, Ser. No. 689,733
Int. Cl.[4] G21C 3/00
U.S. Cl. 376—457 **21 Claims**

1. In a nuclear reactor having metallic components, the improvement wherein at least one metallic component is a composite metallic component, said composite metallic component comprising a member formed from 90–60 volume percent of a metal matrix of a metal selected from the group consisting essentially of zirconium and a zirconium alloy containing less than about 5 percent by weight of an alloying element, said metal matrix having homogeneously incorporated, throughout said matrix, 10–40 volume percent of silicon carbide whiskers.

11. In a nuclear reactor containing metallic components including at least one of fuel cladding, control rods, rod guide thimbles, grids and channels, the improvement wherein said at least one of said metallic components is formed from a metallic composite comprising 90–60 volume percent of a metal matrix of a metal selected from the group consisting essentially of zirconium and a zirconium alloy containing less than about 5 percent by weight of an alloying element, said metal matrix having homogeneously incorporated, throughout said matrix, 10–40 percent by volume of silicon carbide whiskers.

4,707,331

TOP END SUPPORT FOR WATER DISPLACEMENT ROD GUIDES OF PRESSURIZED WATER REACTOR

Donald G. Sherwood, Monroeville Boro; James E. Gillett, Hempfield Township, Westmoreland County, and Douglas E. Ekeroth, Plum Borough, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

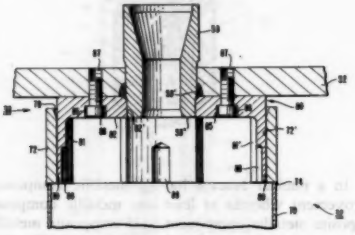
Filed Nov. 14, 1985, Ser. No. 798,194
Int. Cl.[4] G21C 1/01
U.S. Cl. 376—463 **10 Claims**

1. A top end support for rod guides disposed in closely spaced, parallel axial relationship in an inner barrel assembly of a pressurized water reactor vessel, the inner barrel assembly occupying a central portion of the vessel and being of a vertical height extending from a first plate of lower elevation to a second plate of higher elevation within the vessel, each of said rod guides having a thin sidewall portion of elongated configuration and of an axial length corresponding substantially to the vertical height of said inner barrel assembly and having a generally square cross-section, each rod guide accommodating

in axial, sliding relationship therewithin a respectively associated cluster of elongated rods interconnected to extend in parallel axial relationship, comprising, for each said rod guide:

an axially extending sleeve affixed at a lower end thereof to the upper end of a respective said thin sidewall of said rod guide and of an axial length such that said upper end thereof is closely adjacent to but displaced from the lower surface of the second plate when in assembled relationship therewith, said sleeve having an outer surface generally corresponding in cross-section to that of said thin wall portion of said rod guide and an inner circumferential surface of generally cylindrical cross-section;

a fixed cylindrical support having an upper end closure having an upper surface adapted for being positioned in abutting surface contact with the lower surface of the second plate and secured thereto, and having an integral depending sidewall having an exterior surface of generally cylindrical configuration received in telescoping relationship within said circumferential surface of said rod guide sleeve when in assembled relationship therewith and said respective exterior and inner circumferential surfaces of



said fixed cylindrical support and said rod guide sleeve defining a wear-couple permitting relative axial movement of said sleeve relative to said fixed cylindrical support while restraining relative lateral movement therebetween;

a cylindrical extension, extending through a corresponding aperture in the second plate and rigidly secured thereto and defining an alignment axis of an associated fixed cylindrical support, and an array of flow holes in the second plate disposed radially at displaced positions about an associated depending extension;

said upper end closure of said fixed cylindrical support further comprising a central aperture for receiving therein an associated, said depending extension in telescoping relationship therewithin for axially aligning said fixed cylindrical support and a plurality of flow holes therein corresponding to said array of flow holes of the second plate; and

means for rigidly and releasably securing said upper end closure of said fixed cylindrical support to the second plate.

4,707,332

SINTERING PROCESS FOR PREALLOYED POWDERS

Werner Huether, Karlsfeld, Fed. Rep. of Germany, assignor to MTU Moroten-und Turbinen-Union Muenchen GmbH, Munich, Fed. Rep. of Germany

PCT No. PCT/DE86/00044, § 371 Date Oct. 16, 1986, § 102(e) Date Oct. 16, 1986, PCT Pub. No. WO86/04840, PCT Pub. Date Aug. 28, 1986

PCT Filed Feb. 7, 1986, Ser. No. 2,403

Claims priority, application Fed. Rep. of Germany, Feb. 16, 1985, 3505481

Int. Cl.⁴ B22F *3/24*

U.S. Cl. 419—28 **11 Claims**

1. A process for the manufacture of structural parts of complicated shapes from powders of intermetallic phases capable of sintering, comprising the steps of making a pre-alloy of the intermetallic phases by melting, comminuting the pre-alloy into a fine powder, mixing into a mass the pre-alloy powder with at least one additive for increasing ductility, and sintering the thus-formed mass at a temperature of about 70 to about 95% of the absolute melting point of the intermetallic phase into a structural part of increased ductility and a density greater than 95% of the theoretical value.

4,707,333

ALLOY PRODUCTION BY VAPOR CONDENSATION

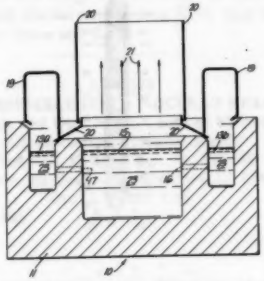
Robert W. Gardiner, Farnham; Brian W. Viney, Farnborough, and Garyth Hughes, Farnham, all of England, assignors to The Secretary of State for Defence in Her Brittanic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Dec. 2, 1985, Ser. No. 803,591

Claims priority, application United Kingdom, Dec. 4, 1984, 8430509

Int. Cl.⁴ C22C *1/00*

U.S. Cl. 420—590 **14 Claims**



1. A method for the replenishment of charge material within an evaporation bath, in a process for the production of alloy by evaporation of molten alloy from the evaporation bath and condensation of the vapor upon a temperature controlled collector all under vacuum conditions wherein said method comprises the following preliminary steps:

providing a charge of molten degassed metal in an evaporation bath;

melting and outgassing feedstock metal in a feedstock melting chamber;

passing molten metal from the evaporation bath and from the feedstock melting chamber to a mixing chamber;

and comprises the following steps which are maintained through the production process:

pumping the molten metal in the mixing chamber to cause turbulent flow therein and thereby cause mixing of the source metals therein;

bleeding a portion of the evaporation bath charge and introducing the bled charge metal into the mixing chamber through a plurality of spaced apart sub-surface bleed passageways which link the evaporation bath with the mixing chamber;

feeding a portion of the mixed metals from the mixing chamber into the evaporation bath through a plurality of spaced apart sub-surface feed passageways which link the mixing chamber with the evaporation bath; and

maintaining metal in the mixing chamber by replenishment with molten metal from the feedstock melting chamber.

4,707,334

ISOLATION METHOD AND APPARATUS FOR STERILIZING CHAMBERS OF FILLING MACHINES

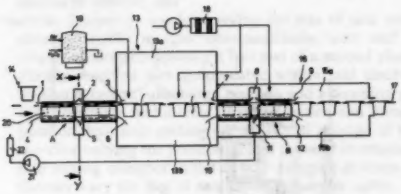
Tolasch Gerhard, Wentorf, Fed. Rep. of Germany, assignor to Kolubus GmbH & Co. KG, Rahden, Fed. Rep. of Germany

Filed Jun. 25, 1986, Ser. No. 878,417

Claims priority, application Fed. Rep. of Germany, Jun. 27, 1985, 3522996

Int. Cl.[4] A61L *2/00;* A23L *3/00;* B65B *55/02*

U.S. Cl. 422—28 17 Claims



1. In a sterilizing method which includes the establishment of a toxic sterilizing atmoshpere in a first chamber, the first chamber having entrance and exit apertures, the improvement comprising the step of:

creating plural zones of different pressure in series with each of the first chamber entrance and exit apertures, the pressure in said zones being less than either the pressure in the first chamber or the ambient atmospheric pressure, said zones being located exteriorly of the first chamber; and

establishing gas flows directed to each of said zones, said directed flows including flows from the first chamber through said apertures to each of said zones and flows directed oppositely with respect to said flows from the first chamber, said oppositely directed flows preventing escape of toxic material from the first chamber to the ambient atmospheres upstream of the chamber entrance aperture and downstream of the chamber exit aperture, said flows from the first chamber preventing ingress of gas comprising said oppositely directed flows to the chamber.

4,707,335

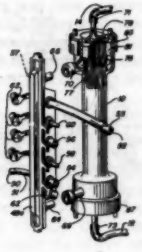
SYSTEM AND APPARATUS FOR DISINFECTING, FOR REUSE, SEPARATION DEVICES FOR BLOOD AND ASSOCIATED FLUID LINES

Philip W. Fentress, Deerfield; Rodney S. Kenley, Evanston, and William J. Schnell, Libertyville, all of Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Continuation of Ser. No. 524,705, Aug. 19, 1983, Pat. No. 4,552,721. This application Aug. 26, 1985, Ser. No. 769,032

Int. Cl.[4] A61L *2/18;* A61M *1/16*

U.S. Cl. 422—44 2 Claims



1. A disinfecting system which comprises:

a separation device for blood defining a blood flow path and a second flow path separated from the blood flow path by semi-permeable membrane means, said device having a blood inlet and a blood outlet accessing the blood flow path and port means for accessing the second flow path;

a blood inlet line having a device end and a patient end, the device end communicating with the blood inlet on said device;

a blood outlet line having a device end and a patient end, the device end communicating with the blood outlet on said device;

a manifold defining an interior cavity and an exterior having at least two connectors which communicate with the patient ends of said blood inlet line and said blood outlet line forming a common connection which allows said blood lines to be in interconnected flow relation through their patient ends, wherein said connectors on said manifold have orifices sized to substantially equilibrate resistance to fluid flow through lines intended to be connected thereto whereby each line receives a substantially equal volume of fluid flowing therethrough; and,

disinfecting reuse solution carried within said separation device for blood, said blodd inlet line, said blood outlet line and said interior cavity of said manifold.

4,707,336

APPARATUS FOR GAS ANALYSIS

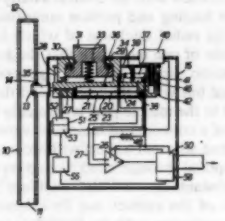
Thomas P. Jones, Sully, United Kingdom, assignor to Lion Laboratories Limited, Barry, United Kingdom

Filed Mar. 4, 1985, Ser. No. 707,573

Claims priority, application United Kingdom, Mar. 2, 1984, 8405481

Int. Cl.[4] G01N *27/46, 1/24*

U.S. Cl. 422—84 1 Claim



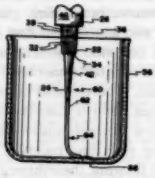
1. Apparatus for detecting alcohol in expired breath comprising a breathing tube having an input end and an output end, an automatic breath sampler connected to said tube at a position between said input and output ends, said breath sampler including a sampling chamber of predetermined volume, a detector for detecting alcohol in a breath sample within said chamber, automatic control means including a flow sensor responsive to flow through said breathing tube and at timer operatively connected to said flow sensor to actuate the sampler automatically after a predetermined interval when a selected breath flow has been sensed, sensing means for detecting any substantial interruption, reduction or reversal in said breath flow through said breathing tube, a warning signal generator responsive to said sensing means which indicates when breath flow has been substantially interrupted, reduced or reversed during a test and which sensing means is operatively connected to said sampler to cause immediate actuation thereof on receipt of said warning signal prior to the expiration of said predetermined interval.

4,707,337

MEDICAL MICRO PIPETTE TIPS FOR DIFFICULT TO REACH PLACES AND RELATED METHODS

David H. Jeffs, and Paul M. Jessop, both of Salt Lake City, Utah, assignors to Multi-Technology, Inc., Salt Lake City, Utah

Filed Aug. 11, 1986, Ser. No. 895,104
Int. Cl.[4] B01L *3/02*; G01N *1/14*
U.S. Cl. 422—100 **10 Claims**



1. A low-cost micro volume pipette tip formed as one-piece from synthetic resinous material comprising:

one-piece wall means extending end-to-end defining an axial bore extending the entire length of the micro pipette tip, the bore precisely defining an interior micro liter volume of predetermined magnitude;

the one-piece wall means defining proximal means by which a pipetting instrument is releasably attached thereto in fluid tight relation;

the one-piece wall means comprising a stiff elongated conical section extending convergently from the proximal means in a forward direction, the conical section comprising a tapered exterior surface, a rigid wall and a tapered interior surface defining a conical axially-directed proximal bore;

the one-piece wall means comprising an elongated leading end portion comprising a substantially zero draft axial capillary bore ending in a minute port, the substantially zero draft capillary bore being aligned and in direct fluid communication with the conical axially-directed proximal bore, the leading end portion comprising ultra thin wall means, the radial thickness of which is not greater than 10/1000ths of one inch such that the leading end portion of the micro pipette tip extend generally linearly when unstressed but when the leading end thereof immediately adjacent to the minute port is manually forced against the bottom of a container of biological extract of the like, the leading end adjacent to port will become sharply curvilinearly disposed through up to 90 degrees without occlusion of the substantially zero draft capillary bore so that essentially all of the extract can be evacuated including the extract contiguous with the bottom of the container which is evacuated parallel to the bottom of the container while the leading end is disposed in such sharply curvilinear orientation.

4,707,338

LIGHT-ACTIVATED AROMA GENERATOR WITH AUTOMATIC CUTOFF

Donald Spector, 380 Mountain Rd., Union City, N.J. 07087

Continuation-in-part of Ser. No. 765,152, Aug. 13, 1985, which is a continuation-in-part of Ser. No. 592,915, Mar. 23, 1984, Pat. No. 4,568,521. This application Nov. 20, 1986, Ser. No. 932,611
The portion of the term of this patent subsequent to Sep. 22, 2004, has been disclaimed.
Int. Cl.[4] A61L *9/17*
U.S. Cl. 422—124 **7 Claims**

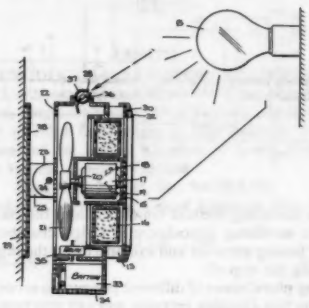
1. In combination with a switch-controlled light bulb disposed in a chamber, an aroma generator which is rendered operative to modify the atmosphere of the chamber only when the switch connected to the light bulb is operated to put the bulb in an "on" or an "off" state, said generator comprising:

A. a case disposed at a position adjacent the bulb and including a compartment for housing of a battery;

B. a low-voltage direct-current motor coupled to a propeller fan and which is housed in said case;

C. a light sensor mounted on said case to intercept light rays from said light source to produce a binary signal pulse when the switch is operated, the polarity of the pulse being positive in said "on" state and negative in the "off" state;

D. an air-permeable cartridge containing an aroma supply and disposed in said case in operative relation to said fan



to exude an aroma into the atmosphere of the chamber at a relatively rapid rate only when an air current is forced through said cartridge by said fan; and

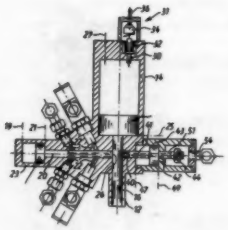
E. signal responsive electronic relay coupled to said sensor and activated by a signal pulse of a given polarity, to connect said battery to said motor to render the generator operative, said relay including a time delay which automatically deactivates the relay after a predetermined period whereby the generator is cut off at the conclusion of the period and is not again rendered operative until the switch is again operated to produced a signal pulse of said given polarity.

4,707,339

HIGH-PRESSURE MIXING HEAD

Vincent L. Johnson, Seabrook, Tex., and Kurt Moser, Lindau, Fed. Rep. of Germany, assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 315,071, Oct. 26, 1981, Pat. No. 4,418,041. This application Jul. 14, 1983, Ser. No. 513,705
Claims priority, application Fed. Rep. of Germany, Oct. 30, 1980, 3040922
Int. Cl.[4] B01F *5/04, 15/02*
U.S. Cl. 422—133 **10 Claims**



1. A high-pressure mixing head for mixing at least two reactive plastics material components for subsequent foaming in a mold, comprising:

a mixing chamber which has opening thereinto nozzle ori-

fices for introduction of said plastics material components into said mixing chamber;

a metering plunger closely received and reciprocable within said mixing chamber;

a mixing chamber outlet;

a discharge section in flow communication with said mixing chamber and extending approximately normal to said mixing chamber, said discharge section being of greater dimensions than said mixing chamber;

means for introducing a blowing agent at a location proximate the confluence of said mixing chamber and said discharge section; and

variable damper means for varying the size of said mixing chamber outlet in flow communication with said discharge section, comprising a free end of a second plunger closely received and reciprocable within said discharge section between a discharge position and a damping position proximate said mixing chamber outlet, and damping position limit stop means positionable at a range of positions for varying the position of said free end in relation to said mixing chamber outlet at said damping position and thereby vary the size of said mixing chamber outlet.

4,707,340

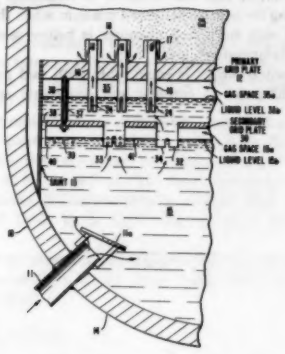
STAGED GUIDE PLATE AND VESSEL ASSEMBLY

John D. Milligan, 650 Prospect Ave., Little Silver, N.J. 07739

Continuation of Ser. No. 541,950, Oct. 14, 1983, abandoned. This application Jan. 28, 1987, Ser. No. 9,023

Int. Cl.[4] B01J *8/18*

U.S. Cl. 422—140 **14 Claims**



1. A staged grid plate and vessel assembly for providing uniform flow distribution of a gas/liquid mixture upwardly into the vessel, said assembly comprising:

(a) a vessel lower portion having a side wall and a lower head attached to the wall;

(b) an upper primary grid plate supported within said vessel lower portion, said primary grid plate containing multiple primary flow distribution tubes extending substantially vertically through said grid plate, said primary tubes being uniformly sized and spaced apart from each other in the grid plate;

(c) a cap covering the upper end of each of said primary flow tubes in said primary grid plate, said cap having an upper end rigidly attached to each of said primary tubes at the tube upper end, said cap having a lower end, said lower end having an edge spaced outwardly from each of the tubes above the primary grid plate, so as to permit flow of a fluid upwardly through the primary tubes and then outwardly from under the lower end edges of the caps into the vessel above the primary grid plate; and

(d) a lower secondary grid plate located below and spaced from said primary grid plate, said secondary grid plate being supported within said vessel lower portion and containing multiple flow secondary distribution tubes passing substantially vertically through the secondary plate, said secondary tubes being without caps and having uniform diameter and spacing, and having greater total cross-sectional area than the primary flow distribution tubes in said primary grid plate, wherein the secondary tubes each have larger cross-sectional area than each primary tube in the primary grid plate, said secondary grid plate being spaced below and supported from said primary grid plate by multiple support rods attached to the primary and secondary grid plates; said vessel lower portion has a feed stream inlet positioned below said secondary grid plate whereby fluid passes first upwardly through the secondary flow tubes in the secondary grid plate and then directly upwardly through the primary flow tubes in the primary grid plate and outwardly from under the lower edges of the caps to provide uniform fluid flow into the vessel.

4,707,341

CATALYST FOR THE BURNING AND CONVERSION OF GASES AND HIGHER HYDROCARBONS, AND APPARATUS FOR THE REDUCTION OF NITRIC OXIDES AND AFTERBURNING OF EXHAUST GAS BY MEANS OF SUCH CATALYST

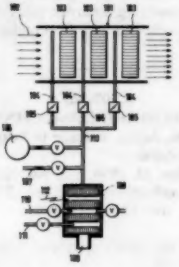
Christian Koch, Erlangen, and Erwin Erdlen, Nuremberg, both of Fed. Rep. of Germany, assignors to Firma EVK Energietechnik Verfahrenstechnik Umwelttechnik, Pegnitz, Fed. Rep. of Germany

Division of Ser. No. 669,552, Nov. 8, 1984, Pat. No. 4,613,583. This application Jun. 27, 1986, Ser. No. 879,642

Claims priority, application Fed. Rep. of Germany, Nov. 10, 1983, 3340682; Apr. 3, 1984, 3412289; Apr. 21, 1984, 3415075

Int. Cl.[4] B01D *53/34;* **B01J** *35/02;* **F01N** *3/10, 3/24*

U.S. Cl. 422—171 **14 Claims**



1. An apparatus for the catalytic reduction of nitric oxides contained in a gas comprising:

a reactor;

means for introducing gas containing nitric oxides into he reactor;

means for introducing a reducing agent into the reactor;

a porous oxidic carrier material arranged in the reactor, aid porous oxidic carrier material being coated with an active; catalytic metal or metal oxide coating containing 1 part cobalt, 1 to 3 parts lanthanum, 2 to 20 weight percent cerium, and 2 to 20 weight percent iron, said percentages being based on the sum of cobalt and lanthanum; and

means for withdrawing catalytically reduced gas from the reactor.

4,707,342

PROCESS FOR SEPARATION OF HYDROGEN AND/OR DEUTERIUM AND TRITIUM FROM AN INERT GAS FLOW AND APPARATUS FOR EFFECTUATION OF PROCESS IN THE COOLING GAS CIRCUIT OF A GAS-COOLED NUCLEAR REACTOR

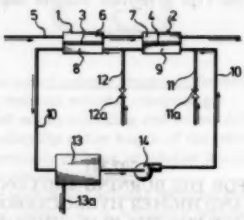
Nicolaos Iniotakis, Julich; Claus-Benedict von der Decken, Aachen; Rudolf Hecker, Julich; Werner Fröhling, Duren, and Rudolf Schulten, Aachen-Richterich, all of Fed. Rep. of Germany, assignors to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung, Julich, Fed. Rep. of Germany

Filed May 24, 1982, Ser. No. 381,346

Claims priority, application Fed. Rep. of Germany, May 21, 1981, 3121125

Int. Cl.[4] C01B *1/26*

U.S. Cl. 423—248 18 Claims



1. In a process for the separation of hydrogen and hydrogen isotopes from an inert gas flow which is contaminated with (i) hydrogen and at least one hydrogen isotope selected from deuterium and tritium or (ii) at least one hydrogen isotope selected from deuterium and tritium or (iii) a mixture of deuterium and tritium, wherein the inert gas which is to be purified is conveyed along the primary side of an exchange wall for hydrogen isotopes, said exchange wall having a secondary side; the improvement comprising: adding an agent on the secondary side of the exchange wall which chemically reacts with the permeating hydrogen isotopes so as to bond the hydrogen isotope or isotopes which are to be separated out of the inert gas flow being purified into a reaction product transportable in a gas flow which is not permeable through said exchange wall, and conveying a carrier gas flow along the secondary side of the exchange wall for conducting away of the reaction product.

4,707,343

APPARATUS FOR STERILIZING CONTACT LENSES

Tetsuya Ando, Kyoto, Japan, assignor to Senju Pharmaceutical Co., Ltd., Osaka, Japan

Filed Jan. 23, 1986, Ser. No. 821,616

Claims priority, application Japan, Nov. 27, 1984, 59-250786

Int. Cl.[4] A61L *2/04*

U.S. Cl. 422—300 3 Claims

1. A contact lens sterilizing apparatus comprising:

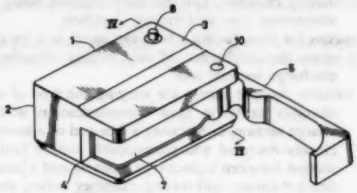
a housing,

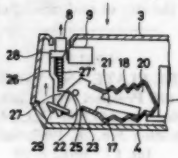
wall means defining a sterilizing chamber disposed on said housing,

heating means for heating said sterilizing chamber, said heating means comprising heating plate means disposed externally of said wall means and including a positive character thermistor secured thereto,

a temperature sensor adapted to detect the temperature of said sterilizing chamber, said temperature sensor comprising a flexible sensor container, a material sealed into said sensor container and having a melting or liquification point corresponding to a predetermined temperature, and a seal member for sealing said sensor container, said seal member including a pivotal mounting for rotationally mounting said seal member on said housing, and including a rod projecting into said sealed material and whose rotational displacement around said pivotal mounting is dependent upon the softening or hardening of said sealed material, and a projection projecting outwardly from the seal member,

an actuating lever comprising a push button which projects from said housing, a spring which biases said actuating lever upwardly, and a pawl which is engageble with said





projection of said seal member to releasably retain said actuating lever in an activated position when the temperature of said sterilizing chamber is below said predetermined temperature, and

a microswitch which is engageable with said push button, and said pawl to activate and deactivate said heating means.

4,707,344

PRODUCTION OF INGREDIENTS FOR DETERGENTS AND SOAP POWDERS FROM ALKALI PHOSPHATES

Griffith Thomas, 81 Lynbara Avenue, St. Ives, New South Wales, 2075, Australia

Filed Jan. 11, 1985, Ser. No. 690,616

Claims priority, application Australia, Jan. 25, 1984, PG3344

Int. Cl.[4] C01B *15/16*

U.S. Cl. 423—312 19 Claims

1. A process for the production of alkali metal polyphosphates and/or pyrophosphates, comprising the steps of

producing an alkali metal orthophosphate by alkaline treatment of phosphate rock,

acidifying said orthophosphate by alkaline treatment of phosphate rock,

acidifying said orthophosphate with sulphuric acid,

heating the reaction mixture at to a temperature of from 300° to 600° C. to produce alkali metal polyphosphates and/or pyrophosphates, and

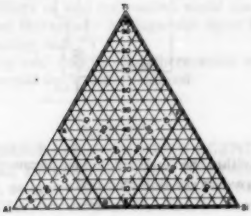
recovering said alkali metal polyphosphates and/or pyrophosphates from the reaction mixture.

4,707,345

TITANIUM-ALUMINUM-SILICON-OXIDE MOLECULAR SIEVE COMPOSITIONS AND PROCESS FOR PREPARING THE SAME

Brent M. T. Lok, New City; Bonita K. Marcus, Rye, and Edith M. Flanigen, White Plains, all of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.

Filed Apr. 26, 1984, Ser. No. 604,236
Int. Cl.[4] C01B *33/20*
U.S. Cl. 423—326 14 Claims



1. Crystalline molecular sieves having chemical composition in the for represented by the unit empirical formula:

$$mR:(Ti_xAl_ySi_z)O_2$$

wherein "R" represents at least one organic templating agent present in the intracrystalline pore system; "m" represents the molar amount of "R" present per mole of $(Ti_xAl_ySi_z)O_2$ and has a value of from zero to about 0.3; and "x" , "y" and "z" represent the mole fractions of titanium, aluminum and silicon, respectively, present as tetrahedral oxides, said mole fractions being such that they are within the compositional area defined by points A, B, F, E and D of FIG. 1 and having a characteristic x-ray powder diffraction pattern selected from the group consisting of Table V, or Table VII, or Table XI or Table XVIII.

7. Process for preparing crystalline molecular sieves having chemical composition in the form represented by the unit empirical formula:

$$mR:(Ti_xAl_ySi_z)O_2$$

wherein "R" represents at least one organic templating agent present in the intracrystalline pore system; "m" represents the molar amount of "R" present per mole of $(Ti_xAl_ySi_z)O_2$ and has a value of from zero to about 0.3; and "x", "y" and "z" represent the mole fractions of titaniium, aluminum and silicon, respectively, present as tetrahedral oxides, said mole fractions being such that they are within the compositional area defined by points A,B,F,E, and D of FIG. 1, said sieves having a characteristic X-ray powder diffraction pattern selected from the group consisting of Table V, Table VII, Table XI and Table XVIII, comprising the step of providing at an effective temperature and for an effective time a reaction mixture composition expressed in terms of molar oxide ratios as follows:

$$aR:(Ti_xAl_ySi_z)O_2:b\ H_2O$$

wherein "R", is an organic templating agent; "a" is an effective amount of "R"; "b" has a value of from greater than zero to about 5000; and "x", "y" and "z" represent the mole fractions of titanium, aluminum and silicon, respectively, in the $mR:(Ti_xAl_ySi_z)O_2$ constituent, and each has a value of at least 0.01.

4,707,346

METHOD FOR DOPING TIN OXIDE

Jacob Hormadaly, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 770,518, Aug. 29, 1985, Pat. No. 4,613,539, which is a division of Ser. No. 460,572, Jan. 24, 1983, Pat. No. 4,548,741, which is a continuation-in-part of Ser. No. 383,452, Jun. 1, 1982, abandoned. This application Apr. 21, 1986, Ser. No. 854,116
Int. Cl.[4] C01F *11/00;* H01B *1/06*
U.S. Cl. 423—518 1 Claim

1. A method for making pyrohlore-related compounds corresponding to the formula

$$Sn_{2-x}^{2+}Ta_{y_3}Nb_{y_2}Sn_{y_1}^{4+}O_{7-x-y1/2}$$

wherein

$x = 0–0.55$

$y_3 = 0–2$

$y_2 = 0–2$

$y_1 = 0–0.5$ and

$y_1 + y_2 + y_3 = 2$,

which comprises firing in a nonoxidizing atmosphere a stoichrometric admixture of finely divided particles of SnO, SnO_2 and a metal pentoxide selected from the group consisting of Ta_2O_5, Nb_2O_5 and mixtures thereof, at a temperature of at least 500° C.

4,707,347

PROCESS FOR THE PRODUCTION OF POTASSIUM SULFATE FROM POTASSIUM CHLORIDE BY MEANS OF ION EXCHANGERS

Sandor Vajna, Bonn, and Gerd Peuschel, Burgdorf, both of Fed. Rep. of Germany, assignors to Kali und Salz, Kassel, Fed. Rep. of Germany

Filed Apr. 17, 1986, Ser. No. 853,346
Claims priority, application Fed. Rep. of Germany, Apr. 17, 1985, 3513828; Mar. 7, 1986, 3607641
Int. Cl.[4] C01D *15/06;* C22B *26/10*
U.S. Cl. 423—552 5 Claims

1. Process for the production of potassium sulfate from potassium chloride by means of a sulfate ion-laden anion exchanger, comprising

preparing a saturated KCl solution,

saturating said solution with K_2SO_4,

contacting the resulting solution with said exchanger to convert KCl to K_2SO_4 upon exchange,

separating first the formed K_2SO_4 crystal-containing reacted solution from said exchanger,

then separating the K_2SO_4 crystal from the removal solution and

reloading said exchanger by contacting with $MgSO_4$ solution.

4,707,348

METHOD FOR NEUTRALIZING WASTE SULFURIC ACID BY ADDING A SILICATE

Roelof D. Schuiling, Bilthoven, Netherlands, assignor to Rijksuniversiteit Utrecht, Utrecht, Netherlands

PCT No. PCT/NL85/00026, § 371 Date Feb. 26, 1986, § 102(e) Date Feb. 26, 1986, PCT Pub. No. WO86/00288, PCT Pub. Date Jan. 16, 1986
PCT Filed Jun. 27, 1985, Ser. No. 853,810
Claims priority, application Netherlands, Jun. 27, 1984, 8402035
Int. Cl.[4] C01F *11/46;* C01B *33/12*
U.S. Cl. 423—554 1 Claim

1. In a method for reacting waste sulfuric acid with the magnesium silicate of olivine; the improvement comprising the steps of:

adding olivine to dilute aqueous waste sulfuric acid, in an amount at least several times in excess of that required fully to react with said acid;

effecting said reaction in an inert nitrogen atmosphere;
agitating the resultant reaction mixture;
allowing said reaction mixture to settle, thereby to obtain a three-phase system consisting of a bottom phase comprising excessive olivine, a middle phase comprising silica gel, and a top phase comprising an aqueous magnesium sulfate solution.

4,707,349

PROCESS OF PREPARING A PREFERRED FERRIC SULFATE SOLUTION, AND PRODUCT

Norman B. Hjersted, 5201 Johnson Dr., Mission, Kans. 66205

Filed Feb. 28, 1986, Ser. No. 834,898
Int. Cl.[4] C01G *41/14*
U.S. Cl. 423—558 **15 Claims**

1. A process for the preparation of a ferric sulfate solution; said process including the steps of:

(a) dissolving metallic iron in an aqueous sulfuric acid solution containing between about 1.0 and 1.1 molar equivalents of sulfuric acid per molar equivalent of iron to be dissolved, to form an initial reaction solution so as to produce ferrous sulfate;

(b) conducting a first stage of oxidation by reacting the initial reaction solution with oxygen added to and dissolved in the reaction solution, while adding sufficient sulfuric acid to balance the requirement for sulfate in converting ferrous sulfate in the reaction solution to ferric sulfate and while maintaining the addition of sulfuric acid at a sufficiently slow rate relative to the rate of reaction between the sulfuric acid and iron to prevent the precipitation of iron sulfate in the final product and continuing until less than about 10% of the iron originally dissolved remains in a ferrous oxidation state and at least 90% of the iron is a ferric product, the ferric product being substantially ferric sulfate in solution;

(c) subsequent to the first stage of oxidation, conducting a second stage of oxidation by addition of hydrogen peroxide to the product solution of paragraph b, in the presence of sulfuric acid so as to further convert ferrous sulfate to ferric sulfate; the total amount of sulfuric acid added in paragraphs a, b and c being such that the molar equivalents of sulfate reactions with iron is less than about 1.5 molar equivalents per molar equivalent of iron;

(d) said step of conducting a second stage of oxidation including conducting said second stage of oxidation until at least 99% of the iron dissolved to form the initial solution has been converted to the ferric oxidation state and a final product having a free sulfuric acid content of less than 0.5% by weight.

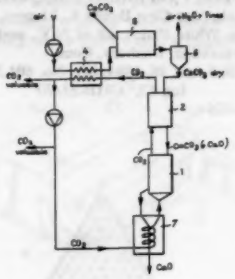
4,707,350

PROCESS AND DEVICE FOR THE DECARBONATION OF MINERALS BY FLUIDIZED BED CALCINATION

Francois Baudequin, Eaubonne, and Patrick Leclere, Jouy Le Moutier, both of France, assignors to Electricite de France - Service National, Paris, France

Filed Sep. 24, 1985, Ser. No. 779,754
Claims priority, application France, Sep. 24, 1984, 84 14622
Int. Cl.[4] C01B *13/14*
U.S. Cl. 423—637 **2 Claims**

1. In a process for the decarbonation of carbonated minerals in the form of fine particles with production of carbon dioxide in a fluidized bed, wherein the improvement comprises that a portion at least of the carbon dioxide produced is recycled as carbon dioxide gas of high purity to be used as sole fluidizing gas of said mineral particles, with the fluidized bed being heated to maintain a temperature between the incipient decarbonation temperature and the clinkering temperature by direct



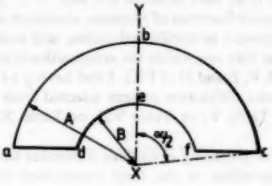
heat supply within the fluidized bed by means of electric resistances immersed in the fluidized bed.

4,707,351

CATALYST AND CATALYTIC PROCESS

Leslie W. Lord, Stockton-on-Tees; Kevin Kendall, Runcorn Cheshire; David T. Williams, Yarm, and John H. Bateson, Stockton-on-Tees, all of England, assignors to Imperial Chemical Industries PLC, London, England

Filed Jan. 14, 1986, Ser. No. 818,753
Claims priority, application United Kingdom, Jan. 22, 1985, 8501526
Int. Cl.[4] C01B *3/38*
U.S. Cl. 423—648 R **7 Claims**



1. A process of reacting a hydrocarbon, or hydrocarbon derivative, with steam, and/or carbon dioxide, over a catalytically active material to produce a gas containing hydrogen characterised in that the catalytically active material is supported by a calcined refractory oxide catalyst support having a saddle configuration, a surface area of at least 0.5 m^2g^{-1}, and a pore volume of at least 0.1 cm^3g^{-1}, said calcined refractory oxide support containing less than 1% by weight of silica and consisting of a calcined calcium aluminate cement composition containing less than 50% by weight of oxidic material other than calcium aluminate and alumina.

4,707,352

METHOD OF RADIOACTIVELY LABELING DIAGNOSTIC AND THERAPEUTIC AGENTS CONTAINING A CHELATING GROUP

Jannis G. Stavrianopoulos, New York, N.Y., assignor to Enzo Biochem, Inc., New York, N.Y.

Filed Jan. 30, 1984, Ser. No. 575,397
Int. Cl.[4] A61K *43/00, 49/02*
U.S. Cl. 424—1.1 **17 Claims**

1. A method of forming a therapeutic or diagnostic agent labeled with a radioactive metal ion, which comprises:

(A) contacting

(1) an unlabeled therapeutic or diagnostic agent comprising
(a) a molecularly recognizable portion attached to
(b) a chelating portion capable of substantially chelating with said radioactive metal ion, wherein said chelating portion is not a part of said molecularly recognizable portion, with
(2) an ion transfer material having said radioactive metal ion bound thereto and having a binding affinity for said radioactive metal ion less than the binding affinity of said chelating portion for said radioactive metal ion,
wherein, prior to said contacting, said chelating portion is unchelated or is chelated with a second metal having a binding affinity with said chelating portion less than the binding affinity of said radioactive metal ion, whereby a radiolabeled therapeutic or diagnostic agent is formed by said contacting; and
(B) separating said radiolabeled therapeutic or diagnostic agent from said ion transfer material.

4,707,353
RADIOGRAPHIC IMAGING AGENTS

Joseph E. Bugaj, Harrison, and Terry W. Grogg, Cincinnati, both of Ohio, assignors to Mallinckrodt, Inc., St. Louis, Mo.
Continuation of Ser. No. 447,862, Dec. 8, 1982, abandoned. This application May 17, 1985, Ser. No. 735,288
Int. Cl.[4] A61K *43/00, 49/02, 49/00*
U.S. Cl. 424—1.1 **14 Claims**

1. A composition, useful in the preparation of technetium-99m-based imaging agents, comprising:
(a) a metal selected from the groups consisting of tin and tin-containing alloys, said metal being employed in an amount effective to reduce the technetium to be added to form an imaging agent; and
(b) a stabilizing amount of stabilizer selected from the group consisting of gentisate, ascorbate, and reductate compounds, and mixtures thereof.

14. A composition, useful in the preparation of technetium-99m-based imaging agents, comprising:
(a) a stabilizer selected from the group consisting of gentisate, ascorbate and reductate compounds, and mixtures thereof; dissolved in
(b) an oxidized pertechnetate solution; and
(c) a metal selected from the group consisting of tin and tin-containing alloys.

4,707,354
MATURE SKIN TREATMENT AND PROTECTANT COMPOSITIONS AND METHODS OF USING SAME

David Garlen, Roselle Park, N.J.; Hilde R. Koehn; Peter W. Koehn, both of Huntington, N.Y., and J. D. McColl, Chattanooga, Tenn., assignors to Alpen Tau, Inc., Huntington, N.Y.
Continuation of Ser. No. 745,699, Jun. 17, 1985, abandoned. This application Jan. 21, 1987, Ser. No. 8,084
Int. Cl.[4] A61K *7/42, 7/44, 9/08, 9/12*
U.S. Cl. 424—47 **10 Claims**

1. A sunscreen, protectant, moisturizing, non-toxic dermatological composition comprising, approximately by weight, 2 to 6% oxybenzone, 1 to 5% ethyl 4-[bis(hydroxypropyl)-]aminobenzoate, 1.4 to 8% padimate O, 1 to 4% 2-phenylbenzimidazole-5-sulfonic acid, 0.5 to 2% allantoin and 1 to 30% dimethicone in a cosmetically and dermatologically acceptable carrier or vehicle.

4,707,355
MICROENCAPSULATED INSECTICIDAL BAIT FORMULATIONS AS FUMIGANTS

Wilfred W. Wilson, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.
Filed Jan. 22, 1985, Ser. No. 692,965
Int. Cl.[4] A01N *25/00*
U.S. Cl. 424—84 **16 Claims**

1. A method of manufacturing an encapsulated insecticidal bait sized for a particular target insect species wherein the bait has the form of a sphere sized for handling by the insect species and which bait is sufficiently rugged to enable machine dispersion and wherein the encapsulation encloses contents thereof until broken open by the insect species, the method comprising the steps of:
(a) forming a first mixture by mixing an oil based insect species attractant food with a poison for the particular insect species and one of a two part system forming a polycondensate:
(b) in a container filled with a liquid not miscible with the first mixture, stirring the liquid while adding the first mixture while controlling the interfacial contact between the liquid and the first mixture by adjustment of surface tension therebetween and causing beads of the first mixture to form in the liquid;
(c) separately gradually adding to the liquid the second of the two part system to cause polycondensate encapsulation of beads of the first mixture wherein the step of adding the second of the two part system is carried out by adding simultaneously therewith an attractant food for the insect species to form an encapsulated bead having the attractant food in the shell formed on the bead; and
(d) removing the beads from the container.

4,707,356
SYNTHETIC PEPTIDE-BASED ANTI-RABIES COMPOSITIONS AND METHODS

James W. Patrick, Solana Beach; Stephen F. Heinemann, La Jolla; Barbara D. Boss, San Diego, and W. Maxwell Cowan, Cardiff by the Sea, all of Calif., assignors to The Salk Institute for Biological Studies, San Diego, Calif.
Division of Ser. No. 752,222, Jul. 3, 1985, Pat. No. 4,652,629. This application Dec. 12, 1986, Ser. No. 941,163
Int. Cl.[4] A61K *37/02*
U.S. Cl. 424—88 **12 Claims**

1. A composition for vaccinating a mammal against rabies which comprises a synthetic protein, which comprises (i) a peptide which has an amino acid sequence comprising the sequence

CDIFTX$_6$SRG,

wherein X_6 is N or T, conjugated to (ii) a carrier protein which is immunogenic in a mammal, said synthetic protein being capable of raising in said mammal an immune response against rabies virus.

4,707,357
IMMUNOLOGICALLY ACTIVE PEPTIDES CAPABLE OF INDUCING IMMUNIZATION AGAINST MALARIA AND GENES ENCODING THEREFOR

John B. Dame, Rockville, Md.; Jackie L. Williams, Universal City, Tex.; Thomas F. McCutchan, Silver Spring, and Imogene Schneider, Gaithersburg, both of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.
Filed Jun. 26, 1984, Ser. No. 624,564
Int. Cl.[4] A61K *37/02;* **C07K** *13/00, 7/10, 7/08, 7/06*
U.S. Cl. 424—88 **30 Claims**

1. An antimalarial immunogenic stimulant comprising an immunogenic carrier and a peptide sequence of between 2 and 1000 consecutive repeats of a sequence Asn-X-Y-Pro, wherein X is Ala or Val and Y is Asn or Asp.

4,707,358

VACCINE AGAINST EPSTEIN-BARR VIRUS

Elliott Kieff; Jerome Tanner; Mary Hummel, and Christopher Beisel, all of Chicago, Ill., assignors to The University of Chicago, Chicago, Ill.

Continuation-in-part of Ser. No. 575,352, Jan. 30, 1984. This application Jul. 23, 1984, Ser. No. 633,558

Int. Cl.[4] **A61K** *39/245, 37/02;* **C07K** *13/00*

U.S. Cl. 424—89 **2 Claims**

1. A polypeptide having the amino acid sequence:

Met Glu Ala Ala Leu Leu Val Cys Gln Tyr Thr Ile Gln Ser Leu Ile His Leu Thr Gly Glu Asp Pro Gly Phe Phe Asn Val Glu Ile Pro Glu Phe Pro Pro Phe Tyr Pro Thr Cys Asn Val Cys Thr Ala Asp Val Asn Val Thr Ile Asn Phe Asp Val Gly Gly Lys Lys His Gln Leu Asp Leu Asp Phe Gly Gln Leu Thr Pro His Thr Lys Ala Val Tyr Gln Pro Arg Gly Ala Phe Gly Gly Ser Glu Asn Ala Thr Asn Leu Phe Leu Leu Glu Leu Leu Gly Ala Gly Glu Leu Ala Leu Thr Met Arg Ser Lys Lys Leu Pro Ile Asn Val Thr Thr Gly Glu Glu Gln Gln Val Ser Leu Glu Ser Val Asp Val Tyr Phe Gln Asp Val Phe Gly Thr Met Trp Cys His His Ala Glu Met Gln Asn Pro Val Tyr Leu Ile Pro Glu Thr Val Pro Tyr Ile Lys Trp Asp Asn Cys Asn Ser Thr Asn Ile Thr Ala Val Val Arg Ala Gln Gly Leu Asp Val Thr Leu Pro Leu Ser Leu Pro Thr Ser Ala Gln Asp Ser Asn Phe Ser Val Lys Thr Glu Met Leu Gly Asn Glu Ile Asp Ile Glu Cys Ile Met Glu Asp Gly Glu Ile Ser Gln Val Leu Pro Gly Asp Asn Lys Phe Asn Ile Thr Cys Ser Gly Tyr Glu Ser His Val Pro Ser Gly Gly Ile Leu Thr Ser Thr Ser Pro Val Ala Thr Pro Ile Pro Gly Thr Gly Tyr Ala Tyr Ser Leu Arg Leu Thr Pro Arg Pro Val Ser Arg Phe Leu Gly Asn Asn Ser Ile Leu Tyr Val Phe Tyr Ser Gly Asn Gly Pro Lys Ala Ser Gly Gly Asp Tyr Cys Ile Gln Ser Asn Ile Val Phe Ser Asp Glu Ile Pro Ala Ser Gln Asp Met Pro Thr Asn Thr Thr Asp Ile Thr Tyr Val Gly Asp Asn Ala Thr Tyr Ser Val Pro Met Val Thr Ser Glu Asp Ala Asn Ser Pro Asn Val Thr Val Thr Ala Phe Trp Ala Trp Pro Asn Asn Thr Glu Thr Asp Phe Lys Cys Lys Trp Thr Leu Thr Ser Gly Thr Pro Ser Gly Lys Glu Asn Ile Ser Gly Ala Phe Ala Ser Asn Arg Thr Phe Asp Ile Thr Val Ser Gly Leu Gly Thr Ala Pro Lys Thr Leu Ile Ile Thr Arg Thr Ala Thr Asn Ala Thr Thr Thr Thr His Lys Val Ile Phe Ser Lys Ala Pro Glu Ser Thr Thr Thr Ser Pro Thr Leu Asn Thr Thr Gly Phe Ala Asp Pro Asn Thr Thr Thr Gly Leu Pro Ser Ser Thr His Val Pro Thr Asn Leu Thr Ala Pro Ala Ser Thr Gly Pro Thr Val Ser Thr Ala Asp Val Thr Ser Pro Thr Pro Ala Gly Thr Thr Ser Gly Ala Ser Pro Val Thr Pro Ser Pro Ser Pro Trp Asp Asn Gly Thr Glu Ser Lys Ala Pro Asp Met Thr Ser Ser Thr Ser Pro Val Thr Thr Pro Thr Pro Asn Ala Thr Ser Pro Thr Pro Ala Val Thr Thr Pro Thr Pro Asn Ala Thr Ser Pro Thr Pro Ala Val Thr Thr Pro Thr Pro Asn Ala Thr Ser Pro Thr Leu Gly Lys Thr Ser Pro Thr Ser Ala Val Thr Thr Pro Thr Pro Asn Ala Thr Ser Pro Thr Leu Gly Lys Thr Ser Pro Thr Ser Ala Val Thr Thr Pro Thr Pro Asn Ala Thr Ser Pro Thr Leu Gly Lys Thr Ser Pro Thr Ser Ala Val Thr Thr Pro Thr Pro Asn Ala Thr Gly Pro Thr Val Gly Glu Thr Ser Pro Gln Ala Asn Ala Thr Asn His Thr Leu Gly Gly Thr Ser Pro Thr Pro Val Val Thr Ser Gln Pro Lys Asn Ala Thr Ser Ala Val Thr Thr Gly Gln His Asn Ile Thr Ser Ser Ser Thr Ser Ser Met Ser Leu Arg Pro Ser Ser Asn Pro Glu Thr Leu Ser Pro Ser Thr Ser Asp Asn Ser Thr Ser His Met Pro Leu Leu Thr Ser Ala His Pro Thr Gly Gly Glu Asn Ile Thr Gln Val Thr Pro Ala Ser Ile Ser Thr His His Val Ser Thr Ser Ser Pro Glu Pro Arg Pro Gly Thr Thr Ser Gln Ala Ser Gly Pro Gly Asn Ser Ser Thr Ser Thr Lys Pro Gly Glu Val Asn Val Thr Lys Gly Thr Pro Pro Gln Asn Ala Thr Ser Pro Gln Ala Pro Ser Gly Gln Lys Thr Ala Val Pro Thr Val Thr Ser Thr Gly Gly Lys Ala Asn Ser Thr Thr Gly Gly Lys His Thr Thr Gly His Gly Ala Arg Thr Ser Thr Glu Pro Thr Thr Asp Tyr Gly Gly Asp Ser Thr Thr Pro Arg Pro Arg Tyr Asn Ala Thr Thr Tyr Leu Pro Pro Ser Thr Ser Ser Lys Leu Arg Pro Arg Trp Thr Phe Thr Ser Pro Pro Val Thr Thr Ala Gln Ala Thr Val Pro Val Pro Pro Thr Ser Gln Pro Arg Phe Ser Asn Leu Ser Met Leu Val Leu Gln Trp Ala Ser Leu Ala Val Leu Thr Leu Leu Leu Leu Leu Val Met Ala Asp Cys Ala Phe Arg Arg Asn Leu Ser Thr Ser His Thr Tyr Thr Thr Pro Pro Tyr Asp Asp Ala Gly Thr Tyr Val

2. A composition comprising an immunologically effective amount of the peptide of claim 1 or an immunologically effective subunit thereof in a suitable carrier.

4,707,359

INSECTICIDE COMPOSITION FOR CONTROLLING INSECTS WHICH HAVE AN AQUATIC BREEDING SITE

Arnold I. McMullen, 70A Quayside Road, Bitterne Manor, Southampton, Hampshire SO2 4AD, England

PCT No. PCT/GB84/00397, § 371 Date Jul. 17, 1985, § 102(e) Date Jul. 17, 1985, PCT Pub. No. WO85/02093, PCT Pub. Date May 23, 1985

PCT Filed Nov. 20, 1984, Ser. No. 760,728

Claims priority, application United Kingdom, Nov. 21, 1983, 8331010; May 22, 1984, 8413024

Int. Cl.[4] **A61K** *39/07;* **A01N** *63/00*

U.S. Cl. 424—92 **9 Claims**

1. An insecticide composition for controlling insects which have an aquatic breeding site, comprising an effective insecticidal amount of a first component which when applied to the surface of a water catchment forms an insoluble monomolecular layer or an insoluble foam layer effective in killing insects at certain stages in their life cycle, said first component being selected from the group consisting of

$C_mH_{2m+1}.(OR)_nOH,$

$C_mH_{2m-1}.(OR)_nOH,$

$C_mH_{2m+1}.(OR.OB)_nOH,$

$C_mH_{2m-1}.(OR.OB)_nOH,$

$C_mH_{2m+1}.CO.(OR)_nOH,$

$C_mH_{2m-1}.CO.(OR)_nOH,$

$C_mH_{2m+1}.CO.(OR.OB)_nOH,$

$C_mH_{2m-1}.CO.(OR.OB)_nOH,$

where R and B are alkylenes and may be the same or different, n is an integer in the range 1 to 3 and m is an integer greater than 14, said group being exclusive of isostearyl ethoxylates; and an effective larvacidal amount of a second component comprising a mosquito larva toxin obtained during growth of bacterial cultures, the first and second components giving rise to a synergistic mixture having a greater effectiveness in control of insects than that exhibited by either the first or second component alone.

4,707,360

VASCULOPROTECTING PHARMACEUTICAL COMPOSITIONS

Pierre-Noel Brasey, Geneva, Switzerland, assignor to Seuref A.G., Vaduz, Liechtenstein

Filed Apr. 29, 1986, Ser. No. 857,152

Claims priority, application Switzerland, Apr. 30, 1985, 1826/85

Int. Cl.[4] **A61K** *37/48, 31/70, 31/35*

U.S. Cl. 424—94.1 **2 Claims**

1. A pharmaceutical composition having vasculoprotecting activity, containing as the active ingredients component (a) which is coenzyme Q_{10} and component (b) which is a member selected from the group consisting of delphinidin, asiaticoside, escin, tribenoside and O-(β-hydroxyethylrutoside) in the ratios between 10:1 and 1:4 of said component (a) to component (b).

4,707,361

GRANULAR ANHYDROUS DICALCIUM PHOSPHATE COMPOSITIONS SUITABLE FOR DIRECT COMPRESSION TABLETING

Carl G. Gustafson, Peekskill, and Carolyn A. Ertell, Yonkers, both of N.Y., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Aug. 2, 1985, Ser. No. 761,988
Int. Cl.[4] C01B *15/16, 25/26;* A61K *33/06, 7/16*
U.S. Cl. 424—154 27 Claims

1. A granular anhydrous dicalcium phosphate having a Loss on Ignition of about 11 percent by weight or less, a particle size sufficient for direct compression tableting wherein at least 90 percent of the particles are greater than about 44 microns and at least 95 percent of the particles are smaller than about 420 microns and a surface area greater than 5 meters^2/gram said granular anhydrous dicalcium phosphate having a Radioactivity Dentin Abrasivity of below about 150.

4,707,362

SUSTAINED RELEASE COMPOSITION

Elie S. Nuwayser, Wellesley, Mass., assignor to Biotek, Inc., Woburn, Mass.

Filed Feb. 15, 1985, Ser. No. 702,008
Int. Cl.[4] A61F *13/00*
U.S. Cl. 424—433 15 Claims

1. A vaginal contraceptive having both rapid release and prolonged release of spermicide at effective concentrations, comprising:

a. a suppository body, comprising hydrophilic material which melts at or below the temperature of the vagina and having incorporated therein a spermicide, the spermicide being released therefrom at effective contraceptive concentrations within the first minute after placement of the contraceptive in the vagina; and

b. at least one film insert in the suppository body, the film insert comprising a water-soluble polymer which is bioerodible and having incorporated therein a spermicide which is released at effective contraceptive concentrations over a period of up to 24 hours after placement of the contraceptive in the vagina.

4,707,363

SOFT STARCHY CHEWING GUM

Yoshinori Sato, Niiza; Yukio Tsuchiya, Tama, and Keiji Fujimoto, Urawa, all of Japan, assignors to Lotte Co., Ltd., Tokyo, Japan

Filed May 20, 1985, Ser. No. 735,761
Int. Cl.[4] A23G *3/30*
U.S. Cl. 426—3 18 Claims

1. A soft starchy chewing gum comprising a gum base and a Turkish delight preparation comprising a source of an α-starch consisting essentially of amylopectin, a sweetener, and water.

4,707,364

COMPOSITION FOR ACCELERATING CHEESE AGING

Jeffrey T. Barach, and Larry L. Talbott, both of Elkhart, Ind., assignors to Miles Laboratories, Inc., Elkhart, Ind.

Continuation-in-part of Ser. No. 574,369, Jan. 27, 1984, abandoned. This application Nov. 1, 1985, Ser. No. 793,776
Int. Cl.[4] A23C *19/032, 19/06;* C12N *1/20, 1/04*
U.S. Cl. 426—36 20 Claims

1. A composition for accelerating the aging process of cheese which consists essentially of:

(a) a preparation of the lactic acid bacteria *L. casei* ATCC 39539 or *L. lactis* ATCC 39538 or a mixture thereof which has been preserved by freezing, freeze-drying, spray drying or fluidized bed drying and wherein at least 20% of the cells of the lactic acid bacteria preparation have been disrupted; and

(b) a dried lipase which is an animal, plant or microbial lipase having a specificity similar to that of kid or calf pre-gastric lipase.

4,707,365

FLAVOR SYSTEM HAVING HIGH CHOCOLATE FLAVOR IMPACT

Louis V. Haynes, Cincinnati; Phillip F. Pflaumer, Ross; George P. Rizzi, Cincinnati, and Bruce A. Roberts, Batavia, all of Ohio, assignors to The Procter & Gamble Co., Cincinnati, Ohio

Filed Jun. 5, 1985, Ser. No. 741,384
Int. Cl.[4] A21D *13/08*
U.S. Cl. 426—94 6 Claims

1. A chocolate chip cookie, which comprises:

(1) a crumb-continuous matrix made from cookie ingredients having distributed therethrough storage-stable discrete crisp regions and discrete chewy regions, said crumb-continuous matrix having an a_w value of from about 0.45 to about 0.60; and

(2) a plurality of chocolate flavored chips associated with said crumb-continuous matrix, each of said chips comprising:

(a) a confectionary fat;

(b) a sugar or sugar alcohol; and

(c) a natural chocolate flavor system having:

(1) at least about 21% cocoa solids by weight of each said chips;

(2) from about 3.5 to about 14 ppm of a mixture of methyl, ethyl, 2,3-dimethyl, 2,5- and 2,6-dimethyl, 2,3,5-trimethyl, and 2,3,5,6-tetramethyl pyrazines; and

(3) a ratio of 2,5- and 2,6-dimethyl pyrazines to 2,3,5-trimethyl pyrazine of from about 1 to about 2 and a ratio of 2,5- and 2,6-dimethyl pyrazines to 2,3,5,6-tetramethyl pyrazine of from about 1 to about 2.

4. A chocolate coated cookie, which comprises:

(1) a crumb-continuous matrix made from cookie ingredients having distributed therethrough storage-stable discrete crisp regions and discrete chewy regions, said crumb-continuous matrix having an a_w value of from about 0.45 to about 0.60; and

(2) a chocolate flavored coating partially or completely surrounding said crumb-continuous matrix, and which comprises

(a) a confectionary fat;

(b) a sugar or sugar alcohol; and

(c) a natural chocolate flavor system having:

(1) at least about 16% cocoa solids by weight of said coating;

(2) from about 3.5 to about 14 ppm of a mixture of methyl, ethyl, 2,3-dimethyl, 2,5- and 2,6-dimethyl, 2,3,5-trimethyl, and 2,3,5,6-tetramethyl pyrazines; and

(3) a ratio of 2,5- and 2,6-dimethyl pyrazines to 2,3,5-trimethyl pyrazine of from about 1 to about 2 and a ratio of 2,5- and 2,6-dimethyl pyrazines to 2,3,5,6-tetramethyl pyrazine of from about 1 to about 2.

4,707,366

METHOD FOR INCREASING THE RATE OF SOLUBILITY OF FUMARIC ACID AND COMPOSITIONS

Daniel R. McSweeney, Plainsboro, N.J., assignor to General Foods Corporation, White Plains, N.Y.

Filed May 27, 1986, Ser. No. 867,832
Int. Cl.[4] A23L *1/22, 1/226*
U.S. Cl. 426—96 13 Claims

1. A process for preparing a fumaric acid-containing composition having an increased rate of solubility which comprises:

(a) grinding granular fumaric acid to a particle size such that a minimum of 80% by weight of the particles of ground acid are 10 microns or less in diameter and no more than

90% by weight of the particles of ground acid are 50 microns or less in diameter;

(b) preparing a wetting agent comprising water, a polyol and an alkali; wherein said water is an amount effect to form hydrous fumaric acid, said polyol is in an amount effective inhibit drying out of the treated fumaric acid and said alkali is in an amount effect to neutralize any extra fine fumaric acid particles and

(c) combining the ground acid with an amount of the wetting mixture effective to increase the solubility of the fumaric acid.

4,707,367

SOLID ESSENTIAL OIL FLAVOR COMPOSITION

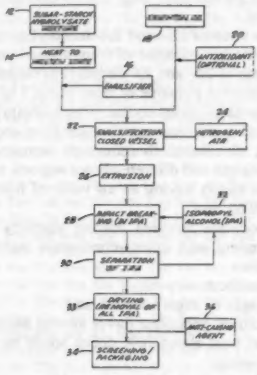
Dennis H. Miller, Safety Harbor, Fla., and Jerry R. Mutka, Corona, Calif., assignors to Sunkist Growers, Inc., Sherman Oaks, Calif.

Continuation of Ser. No. 754,105, Jul. 12, 1985, Pat. No. 4,610,890, which is a continuation-in-part of Ser. No. 631,302, Jul. 16, 1984, abandoned. This application Jun. 16, 1986, Ser. No. 874,602

The portion of the term of this patent subsequent to Sep. 9, 2003, has been disclaimed.

Int. Cl.[4] A23L *1/222*

U.S. Cl. 426—96 **4 Claims**



1. A stable, melt-based and extruded solid essential oil composition in particulate form produced by the procees comprising the steps of:

(a) forming an aqueous mixture of a sugar, a starch hydrolysate and an emulsifier and heating said mixture to approximately its boiling point but not greater than about 126° C.

(b) combining and blending an essential oil flavor with said aqueous mixture by agitating said aqueous mixture and said essential oil flavor in a closed vessel under a pressure of about 7 to 50 psi to form a homogeneous melt;

(c) extruding said homogeneous melt into a relatively cool solvent to form a solid extruded material; and

(d) drying and combining said solid extruded material with an anti-caking agent to produce a stable and relatively non-hygroscopic particulate product having the character of extruded solid amorphous particles, the particles consisting of a sugar, starch hydrolysate, selected emulsifier, selected essential oil flavor and water, the essential oil flavor forming about 14 to 30% by weight of the essential oil flavor in substantially completely encapsulated form.

4,707,368

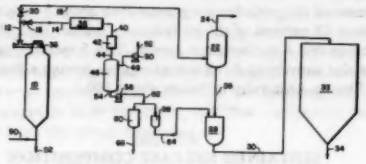
PROCESS OF STEAMING AND PERCOLATING COFFEE

Gerald J. Vogel, Tarrytown, N.Y.; Donald T. Kearney, Bayonne, N.J.; Belkis K. Akpinar, Parsippany, N.J., and Charles T. Moorman, Harrington Park, N.J., assignors to General Foods Corporation, White Plains, N.Y.

Continuation-in-part of Ser. No. 701,822, Feb. 14, 1985, abandoned, which is a continuation-in-part of Ser. No. 588,830, Mar. 12, 1984, abandoned. This application Nov. 27, 1985, Ser. No. 802,792

Int. Cl.[4] A23F *5/26, 5/48*

U.S. Cl. 426—386 **14 Claims**



1. An improved process for steaming and thereafter extracting roasted and ground coffee in a percolator column wherein the improvement comprises:

(a) vacuum steaming roasted and ground coffee for a period of at least 10 minutes at a temperature less than 200° F. in an elongated bed of the coffee maintained at a pressure from 10" to 27"(Hg) to produce a steam aroma, whereby the steam treatment of the coffee effects an internal refluxing and rectification of a codistilled mixture of steam, acids and volatile flavors with steam aroma;

(b) recovering the steam aroma from step (a) by passage of same through a wedge-wire draw-off apparatus, the steam aroma being collected until at least 0.1% thereof by weight of the whole beans prior to wetting is recovered, said wedge-wire draw-off apparatus comprising a helically wound wire assemblage being internal to the percolator located at the upper extremity of the percolation zone operative to substantially pass steam aroma and thereafter coffee extract through the wire assemblage, the coffee being loaded in the column thereof to the point of coverage of the bayonnet;

(c) thereafter percolating water through the coffee in the column to extract the solids therein for a period of at least one hour during which the extract is recovered from the percolator column by passage through the wedge-wire draw-off apparatus; and

(d) eventually combining the extract and the aqueous steam aroma.

4,707,369

PROCESS FOR TREATING WET FAT BIOLOGICAL TISSUE USING A WATER MISCIBLE SOLVENT

Arnold Suresky, Colonia, N.J., assignor to Faraday Laboratories, Inc., Hillside, N.J.

Continuation-in-part of Ser. No. 582,960, Feb. 23, 1984, abandoned. This application Aug. 19, 1986, Ser. No. 898,012

Int. Cl.[4] A23B *4/04;* **A23L** *3/00*

U.S. Cl. 426—417 **10 Claims**

1. The process of simultaneously desiccating and defatting fat biological tissue containing in excess of 20% water by weight comprising the steps of comminuting the wet fat biological tissue, thereafter introducing the comminuted tissue into a body of solvent disposed within a vessel to form a slurry of solvent, comminuted tissue and water, the solvent consisting of a mixture of low aliphatic alcohol and water, said mixture having less than 5% water by volume, heating the body of slurry to establish boiling conditions and to produce an azeotropic vapor of solvent and water in the vessel, maintaining the slurry under boiling conditions for a period of time to reduce the water content of the comminuted tissue, withdrawing the

azeotrope vapor from the vessel during said period of time, recovering the solvent from the azeotrope of water and solvent, and returning the solvent to the vessel.

4,707,370

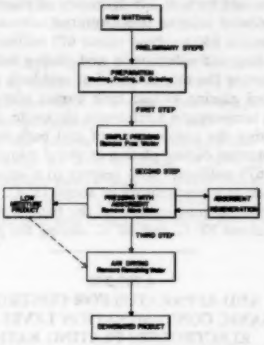
FOOD DEHYDRATION PROCESS

Frederic J. Kakis, 1534 Harding St., Orange, Calif. 92667

Continuation of Ser. No. 728,946, Apr. 30, 1985, abandoned. This application Aug. 12, 1986, Ser. No. 895,726

Int. Cl.[4] A23B *7/02*; F26B *5/16*

U.S. Cl. 426—443 **18 Claims**



1. A process for dehydrating a foodstuff of plant origin comprising:

(1) pressing said foodstuff to remove a substantial amount of the water present in said foodstuff;

(2) contacting, once more under pressure, the thus-pressed foodstuff with a water absorbent to remove, by absorption, a substantial amount of the remaining water present in said foodstuff and provide a low moisture foodstuff, wherein there is a water permeable barrier between said water absorbent and said foodstuff, and further wherein said water is transferred irreversibly to said water absorbent; and

(3) subjecting the thus-obtained low moisture foodstuff to air drying in a low moisture atmosphere to provide a dehydrated product.

4,707,371

PROCESS FOR PREPARING DRIED PRE-GELATINIZED CEREAL GRAIN

Noriaki Yamaguchi, Jyouyou; Shozo Sugano, Nara, and Kayo Enomoto, Suita, all of Japan, assignors to House Food Industrial Company Limited, Higashiosaka, Japan

Filed Feb. 13, 1986, Ser. No. 829,073

Claims priority, application Japan, Feb. 26, 1985, 60-37116

Int. Cl.[4] A23L *1/10, 1/182*

U.S. Cl. 426—462 **9 Claims**

1. A process for preparing dried pre-gelatinized cereal grain, which comprises subjecting pre-gelatinized cereal grain to a high temperature water-immersing treatment for 5 to 25 minutes at a temperature of 50° to 85° C. followed by a low temperature water-immersing treatment for 15 to 25 minutes at a temperature of 15° to 30° C. so as to adjust the water content thereof to between 73 and 84 weight %; and then drying the resulting cereal grain.

4,707,372

PROCESS FOR THE REMOVAL OF SKINS FROM TOMATOES USING THERMOPHYSICAL METHODS

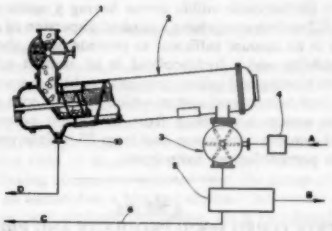
Camillo Catelli, Parma, Italy, assignor to Rossi & Catelli S.p.A., Italy

Filed Mar. 25, 1986, Ser. No. 843,993

Claims priority, application Italy, Apr. 4, 1985, 40035 A/85

Int. Cl.[4] A23L *1/00*

U.S. Cl. 426—481 **2 Claims**



1. Process for the removal of tomato skins using thermophysical methods, comprising the steps of

scalding the outer surface of tomatoes in a first pressurized environment containing saturated steam supplied under pressure,

subjecting the scalded tomatoes to sudden depressurization by bringing the scalded tomatoes into contact with tomato juice supplied at a temperature lower than that of the steam, in a second pressurized environment having a pressure lower than the pressure in said first pressurized environment to separate the skins from the tomatoes,

drawing off the skinned tomatoes, tomatoe juice, tomatoe skins and tomatoe fragments from the second pressurized environment,

separating the skinned tomatoes from the tomatoe juice, tomatoes skins and tomatoe fragments, and

recovering the tomatoe juice from the tomatoe skins and tomatoe fragments.

4,707,373

EDIBLE COMPOSITIONS COLORED WITH (2-ALKOXY-4-SULFONYL-5-ALKYPHENYL)AZO-1-HYDROXYNAPHTHALENE SULFONIC ACIDS

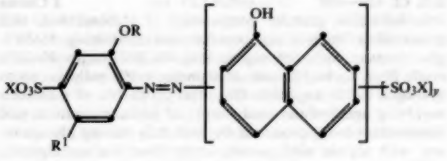
Wayne L. Cook, Cincinnati, and Robert P. Huth, Milford, both of Ohio, assignors to Hilton Davis Co., Cincinnati, Ohio

Division of Ser. No. 617,451, Jun. 5, 1984. This application Jul. 18, 1986, Ser. No. 887,308

Int. Cl.[4] A23L *1/275*

U.S. Cl. 426—540 **7 Claims**

1. A method of coloring edible compositions which comprises incorporating into said edible compositions a monoazo compound having the structural formula



wherein:

R and R^1 independently represent non-tertiary C_1 to C_4 alkyl;

X represents hydrogen or any physiologically acceptable cation; and

y represents 1 or 2.

4,707,374

THERMOSTABLE EDIBLE CREME

Gail G. King, Flanders, N.J.; Jiann-Yuh Chen, Irving, and Barbara J. Keys, Arlington, both of Tex., assignors to Frito-Lay, Inc., Dallas, Tex.

Filed Nov. 12, 1986, Ser. No. 929,423

Int. Cl.[4] A21D *13/08;* **A23L** *1/04;* **A23G** *3/00*

U.S. Cl. 426—572 **23 Claims**

1. A thermostable edible creme having a water activity of about 0.7 or less comprising a cooked dispersion of a modified starch in an amount sufficient to provide body, short texture and stability and a hydrocolloid in an amount sufficient to provide binding and gelling properties at high temperatures. In a low-moisture solvent system which contains corn syrup, said solvent system comprising from 25 weight percent to 100 weight percent corn syrup and from 75 weight percent to 0 weight percent lactose hydrolysate.

4,707,375

STRUCTURED FOOD PRODUCTS AND PROCESS

Keith Buckley, Melton Mowbray; Colin T. Prest, Stathern, and Paul Wilkinson, Quorn, all of England, assignors to Mars G. B. Limited, London, England

Filed Mar. 5, 1986, Ser. No. 836,440

Claims priority, application United Kingdom, Mar. 8, 1985, 8505980

Int. Cl.[4] A23L *1/195*

U.S. Cl. 426—578 **13 Claims**

1. A pasteurized or sterilized structured food or animal feed product comprising:

0.1–20 percent by weight of amylose or high amylose starch having an amylose content not below 25 percent by weight and, interacted therewith to form a gel, water soluble components of Chinese grass in a weight proportion from 1:20 to 10:1 parts if calculated as a dry water soluble extract of Chinese grass or from 1:10 to 30:1 if calculated as unextracted Chinese grass material; and

a sealed container containing said structured food or animal feed product which has been pasteurized or sterilized by heat processing; whereby said water soluble components of Chinese grass are employed as a thickening agent for said gel at pasteurizing or sterilizing temperatures.

4,707,376

GRANULAR COMPOSITION OF DIFFICULT DIGESTIBLE POLYSACCHARIDES

Kenichi Mursoka; Yoichi Setoguchi; Tadamasa Kawase; Hiroitsu Kawata, all of Saitama; Hisamoto Komatsu, Tokyo, and Makoto Uchida, Saitama, all of Japan, assignors to Yamanouchi Pharmaceutical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 521,223, Aug. 8, 1983, abandoned, which is a continuation of Ser. No. 311,610, Oct. 15, 1981, abandoned. This application Nov. 21, 1985, Ser. No. 800,354

Claims priority, application Japan, Oct. 29, 1980, 55-152454

Int. Cl.[4] A23L *1/308, 1/30*

U.S. Cl. 426—658 **2 Claims**

1. An edible granular composition of glucomannan, said composition being a non-powder, and containing 55–65% glucomannan, up to 3% alginic acid, 10–20% pectin, 10–20% crude fiber, up to 5% sodium alginate, 4–8% pullulan, up to 4% agar, 3–8% vegetable fiber, and up to 1% of a calcium supplying agent of the total weight of said composition, said composition being produced by uniformly mixing glucomannan with alginic acid, pectin, crude fiber, sodium alginate, pullulan, agar, vegetable fiber, and a calcium supplying agent; kneading the composition thus formed with a mixture of water and either ethanol or isopropanol; granulating the kneaded mixture is an extrusion-type rotary-type granulator to provide granules of said composition; sieving the granules; and drying the sieved granules without using any excipient and binder.

4,707,377

COPPER PLATING

Robert J. Capwell; Ronald A. Kaschak, both of Vestal; Donald G. McBride, Binghamton; Robert G. Rickert, Johnson City, and Donald P. Seraphim, Vestal, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 547,298, Oct. 31, 1983, abandoned. This application Oct. 27, 1986, Ser. No. 925,511

Int. Cl.[4] C23C *18/40*

U.S. Cl. 427—8 **13 Claims**

1. A process for plating copper from an electroless plating bath onto a substrate to reduce plating voids comprising:

(a) providing an electroless aqueous copper plating bath containing a source of cupric ion, a reducing agent for the cupric ion, and a complexing agent for the cupic ion in amounts effective to plate copper onto said substrate, wherein said bath, at a temperature of about 73° C., has a mix potential relative to a saturated calomel electrode of about minus 630 to about minus 675 millivolts;

(b) providing said substrate in said plating bath;

(c) monitoring the mix potential of said bath during plating including placing in said bath during plating and at the plating temperature a reference electrode; and

(d) adjusting the composition of said bath to maintain the mix potential during plating at about minus 630 to about minus 675 millivolts with respect to a saturated calomel electrode at a temperature of about 73° C.; and

(e) wherein the temperature of the bath is maintained between about 70° C. and 80° C. during the plating.

4,707,378

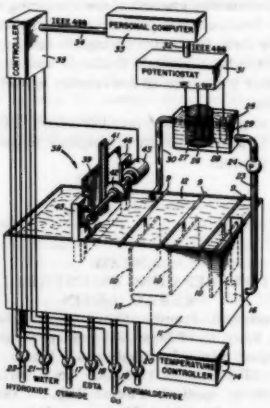
METHOD AND APPARATUS FOR CONTROLLING THE ORGANIC CONTAMINATION LEVEL IN AN ELECTROLESS PLATING BATH

Donald G. McBride, Binghamton, and Robert G. Rickert, Endwell, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jul. 11, 1986, Ser. No. 884,330

Int. Cl.[4] C23C *18/40*

U.S. Cl. 427—8 **10 Claims**



1. A method for controlling contaminants in an electroless plating bath comprising:

measuring the complex impedance between a potentiostat working electrode and counter electrode immersed in said electroless plating bath;

determining from said complex impedance a capacitive reactance and double layer capacitance of said bath; and

exposing a dummy plating panel in said plating bath such that the exposed area of said dummy plating panel varies

as said double layer capacitance level varies, whereby said dummy plating panel exposed to said electroless plating bath will plate out contaminants in said bath, maintaining said contaminant level at a predetermined minimum level.

4,707,379

PROTECTIVE LAYER FOR CARBONACEOUS MATERIALS AND METHOD OF APPLYING THE SAME

Karel Neufuss; Ales Macku; Antonín Forejt, all of Praha, and Pavel Kasík, Plzen, all of Czechoslovakia, assignors to Ceskoslovenska akademie ved, Czechoslovakia

Filed Dec. 24, 1985, Ser. No. 812,964

Int. Cl.[4] B05D *1/10*

U.S. Cl. 427—34 **10 Claims**

1. A method for producing a protective layer on a carbonaceous material by plasma coating comprising the steps of:

directing a plasma flame of a water stabilized plasma burner toward the carbonaceous material, and

feeding into the plasma flame a composition comprising between about 85 w/o to about 99 w/o of aluminum having a particle size of between about 0.09 mm to about 0.180 mm, and about 1 w/o to about 15 w/o of silicon having a particle size of between about 0.07 mm to about 0.165 mm.

4,707,380

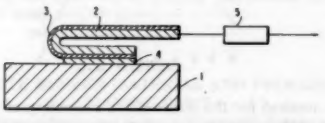
PROCESS FOR PREPARING A MAGNETIC RECORDING MEDIUM

Hiroshi Hashimoto; Tsutomu Okita, and Yoshito Mukaida, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 697,820, Feb. 4, 1985, abandoned. This application Jun. 17, 1986, Ser. No. 875,259

Int. Cl.[4] H01F *10/02*

U.S. Cl. 427—40 **29 Claims**



1. A process for preparing a magnetic recording medium comprising subjecting a surface of a non-magnetic support having a surface roughness of no less than 0.01 μm to a non-contact surface treatment, providing an intermediate layer containing a compound polymerizable by electron beam or ultraviolet radiation exposure on the surface of the support, wherein the intermediate layer is provided by coating a composition containing said compound polymerizable by electron beam or ultraviolet radiation exposure and having a viscosity of from 1 to 1,000 cps, exposing said intermediate layer to electron beam or ultraviolet radiation, and then providing a magnetic layer on the radiation-exposed intermediate layer, wherein said magnetic layer comprises ferromagnetic particles and a binder, further wherein at least the surface of the support which is subjected to non-contact surface treatment is the surface on which the intermediate layer containing the compound polymerizable by electron beam or ultraviolet radiation exposure is formed, wherein said composition provides a leveling effect before hardening by radiation exposure.

4,707,381

METHOD FOR FINISH COATING ON POLYURETHANE FORMED ARTICLES

Takashi Toyama, Yokohama; Masashi Ohno, Hatano; Kiminori Ishii, Ebina; Shosaku Yamamoto, and Kazuo Kakinuma, both of Yokohama, all of Japan, assignors to Nippon Oil and Fats Co., Ltd., Tokyo and Nissan Motor Co., Ltd., Yokohama, both of, Japan

Filed May 22, 1986, Ser. No. 866,178

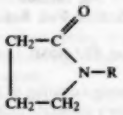
Claims priority, application Japan, Jun. 3, 1985, 60-120069

Int. Cl.[4] B05D *3/02*

U.S. Cl. 427—407.1 **8 Claims**

1. A method for finish coating a shaped, polyurethane article, which comprises:

coating directly on the surface of a polyurethane article which has not been coated with a primer, a first coating layer of a finish paint composition comprising a first film-forming paint component selected from the group consisting of (1) a single-liquid thermosetting paint comprising a polyester resin or an acrylic resin, in combination with a cross-linking component selected from the group consisting of an aminoplast, a blocked aliphatic isocyanate and a blocked cycloaliphatic isocyanate, (2) a two-liquid urethane paint comprising a polyester resin or an acrylic resin, in combination with a cross-linking component selected from the group consisting of an aliphatic isocyanate and a cycloaliphatic isocyanate, and (3) a lacquer paint made from an acrylic resin, nitrocellulose or cellulose acetate butyrate, said finish paint composition containing from 5 to 40% by weight of at least one compound having the formula



wherein R is hydrogen or alkyl having up to 4 carbon atoms; then heating the coated polyurethane article at a temperature of at least 50° C., but lower than the thermal deformation temperature of the polyurethane article, to cure said coating layer.

4,707,382

DEVELOPER CARRIER AND A METHOD FOR MANUFACTURING THE SAME

Shoji Tajima, Higashikanamachi; Yasuo Kadomatsu, Yokohama; Yoshio Miyazaki, Funabashi; Michikazu Sakurai, Yokohama, and Kimio Anze, Kawasaki, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Sep. 25, 1984, Ser. No. 654,257

Claims priority, application Japan, Sep. 28, 1983, 58-178286; Sep. 28, 1983, 58-178287; Sep. 28, 1983, 58-178288; Oct. 5, 1983, 58-185122; Oct. 11, 1983, 58-188308; Dec. 13, 1983, 58-233488; Dec. 13, 1983, 58-233489; Dec. 26, 1983, 58-244340; Dec. 26, 1983, 58-244341

Int. Cl.[4] B05D *5/12*

U.S. Cl. 427—58 **15 Claims**

1. A method for manufacturing a developer carrier for use in a developing device, comprising the steps of:

preparing an electrically conductive support;

forming an underlying layer of composite material including an elastic material and a magnetic material;

magnetizing said underlying layer to produce alternating N and S polarities at a predetermined pitch;

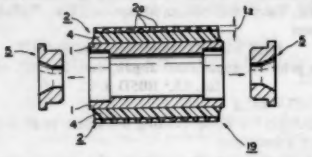
forming a first layer of first dielectric, adhesive agent on said underlying layer;

applying a plurality of electrode particles on said first layer;

forming a second layer of second dielectric, adhesive agent on said first layer and said plurality of electrode particles thereby forming a to-be-formed electrode layer by said

first and second layers and plurality of said electrode particles; and

processing an outer surface of said to-be-formed electrode layer to form an electrode layer having a predetermined



thickness with said plurality of electrode particles being embedded in said electrode layer as electrically isolated from one another and being partly exposed at said processed outer surface.

4,707,383

PROCESS FOR COATING GLASS WITH A FILM OF TIN OXIDE

Gunther Mattes, and Gunter Ortmanns, both of Aachen, Fed. Rep. of Germany, assignors to Saint Gobain Vitrage, Neuilly-sur-Seine, France

Continuation of Ser. No. 428,078, Sep. 29, 1982, abandoned, which is a continuation of Ser. No. 243,750, Mar. 16, 1981, abandoned, which is a continuation-in-part of Ser. No. 240,407, Mar. 4, 1981, abandoned. This application Oct. 18, 1985, Ser. No. 788,509

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1980, 3010077

Int. Cl.[4] **B05B** *5/06*

U.S. Cl. 427—168 **15 Claims**

1. A process for forming a coating of tin oxide on the surface of a transparent refractory substrate material which comprises:

heating the substrate material to a temperature of from about 400° to 650° C.;

mixing a predetermined amount of finely divided particles of a dry, pyrolytically decomposable organic tin oxide having a particle size of not greater than about 20 microns and being pyrolytically decomposable at a temperature below that of the heated substrate with a predetermined amount of a dry dibutyl tin halogen containing compound in powder form, said compound selected from the group dibutyl tin difluoride, dibutyl tin ammonium tetrafluoride and dibutyl tin trifluoroacetate;

suspending said dry powder mixture in an anhydrous gas carrier in the absence of a fluoride containing gas or an organic solvent;

projecting said powder mixture and carrier gas onto said heated substrate; and

pyrolytically decomposing said powder mixture upon the surface of the heated substrate to form an adherent coating of tin oxide thereon.

4,707,384

METHOD FOR MAKING A COMPOSITE BODY COATED WITH ONE OR MORE LAYERS OF INORGANIC MATERIALS INCLUDING CVD DIAMOND

Herbert Schachner, Grand-Lancy; Heinz Tippmann, Le Lignon; Benno Lux, Scuol/Gr, all of Switzerland; Klas G. Stjernberg, Huddinge, and Anders G. Thelin, Vällingby, both of Sweden, assignors to Santrade Limited, Lucerne, Switzerland

Filed Jun. 24, 1985, Ser. No. 747,962

Claims priority, application Sweden, Jun. 27, 1984, 8403428

Int. Cl.[4] **C23C** *16/26, 16/32*

U.S. Cl. 427—249 **15 Claims**

1. A chemical vapour deposition (CVD) method for manufacturing a diamond clad composite body by depositing one or, successively, further adherent polycrystalline diamond layers substantially free from intercrystalline binder on (I) a core substrate selected from (a) metal bonded hard metallic compounds, (b) ceramic materials and (c) metals or alloys, said

method involving contacting the heated core with an activated gaseous mixture of hydrocarbon and hydrogen, characterized in that said mixture is activated by passing over a tantalum heater to a temperature of 1500° to 2500° C.

4,707,385

METHOD FOR DIRECTLY ENAMELING STEEL PARTS USING A SINGLE ENAMEL COATING

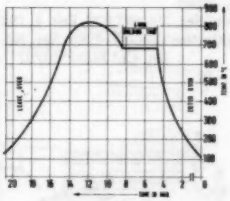
Heinrich Warnke, Marienfeld; Friedel Kaup, Gutersloh; Bernhard Bersch, Dortmund; Willi Mertinkat, Dortmund, and Ulrich Tenhaven, Dortmund, all of Fed. Rep. of Germany, assignors to Miele & Cie. GmbH & Co. and Hoesch Aktiengesellschaft, both of, Fed. Rep. of Germany

Continuation of Ser. No. 689,390, Jan. 7, 1985, abandoned. This application May 27, 1986, Ser. No. 869,852

Claims priority, application Fed. Rep. of Germany, Nov. 1, 1984, 3400619

Int. Cl.[4] **B05D** *3/02*

U.S. Cl. 427—374.1 **6 Claims**



1. A method for the direct white enameling of steel parts using a single enamel coating particularly suited for the direct white enameling of steel parts of the type comprising steel sheets of aluminum stabilized continuously cast sheet material, said method comprising the steps of:

applying a single coating of an enamel slurry to the surface of the steel part to be enameled;

drying the slurry on the slurry coated steel part;

degasifying substantially simultaneously the slurry and the steel part coated with the slurry by heating the slurry coated steel part to a degasifying temperature which degasification temperature is at a temperature less than the firing temperature of the enamel coating wherein the slurry coated steel part is held within the degasifying temperature range for a time period sufficient to diffuse hydrogen gas from the steel part and the slurry coating, said diffused hydrogen gas passing from the steel part through the unfired enamel slurry coating to the atmosphere;

firing the degasified enamel slurry coating on the degasified steel part by increasing the temperature of the degasified

enamel slurry coated steel part to the enamel firing temperature directly from the degasifying temperature without cooling the degasified slurry coated steel part between the degasifying step and the firing step;

maintaining the temperature of the slurry coated steel part at the enamel firing temperature for a time period sufficient to fire the single enamel coating, and

cooling the fired enamel coated steel part wherein the temperature of the fired enamel coated steel part is lowered from the enamel firing temperature to a lower cooling temperature during a predetermined cooling time interval.

4,707,386

PROCESS FOR THE PRODUCTION OF SHEET STRUCTURES

Walter Schäfer, Cologne; Hanns P. Müller, Odenthal; Rolf Küchenmeister, and Armin Sickert, both of Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen Bayerwerk, Fed. Rep. of Germany

Filed Dec. 22, 1986, Ser. No. 944,782

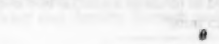
Claims priority, application Fed. Rep. of Germany, Jan. 11, 1986, 3600595

Int. Cl.[4] B05D *3/02*

U.S. Cl. 427—386 **2 Claims**

1. A process for the production of a water-resistant and solvent-resistant coating which comprises coating a substrate with an aqueous coating composition containing as binder a mixture of

(1) a reaction product of an organic polyisocyanate with a salt of cyanamide and a base comprising a member selected from the group consisting of ammonia, volatile primary and secondary amines having a pKb-value of at least 3.1 and volatile aliphatic tertiary amines, wherein said reaction products contain anionic structural units of the formula



in a quantity of about 5 to 1200 milliequivalents per 100 grams of reaction product and

(2) a polyepoxide having at least 2 epoxide groups per molecule in an epoxide equivalent weight of at least about 80, said polyepoxide being present in a quantity corresponding to an equivalent ratio of epoxide groups to said anionic structural units of about 0.1:1 to 3:1, and

cross-linking the binder of the coating composition at a temperature of about 5°–200° C.

4,707,387

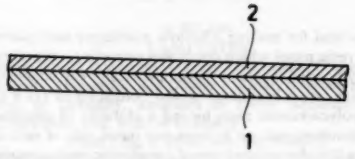
COMPOSITE RUBBER MATERIAL AND PROCESS FOR MAKING SAME

Isamu Sakane, Ohtsu, and Satsuki Kawauchi, Shiga, both of Japan, assignors to I.S.T. Corporation, Shiga, Japan

Division of Ser. No. 788,432, Oct. 17, 1985, abandoned. This application Dec. 9, 1986, Ser. No. 940,163

Int. Cl.[4] B05D *3/02*

U.S. Cl. 427—393.5 **4 Claims**



1. A process for manufacturing a composite material comprising a rubber substrate bearing a layer of fluorine resin of 10 microns to about 1 millimeter in thickness, said process comprising the steps of coating said rubber substrate with said fluorine resin and baking said fluorine resin at a temperature over the melting point of said fluorine resin, and wherein said fluorine resin is baked at a temperature over 400° C. for not more than 7 minutes, so as to not substantially deteriorate said rubber substrate.

4,707,388

HEAT-RECOVERABLE ARTICLE

George B. Park, Purton, Nr. Swindon, and David J. Barker, Faringdon, both of England, assignors to Raychem Limited, London, England

Continuation of Ser. No. 616,698, Jun. 13, 1984, abandoned, which is a continuation of Ser. No. 411,184, Aug. 25, 1982, abandoned. This application Jan. 23, 1986, Ser. No. 822,683

Claims priority, application United Kingdom, Sep. 14, 1981, 8127629

Int. Cl.[4] C09J *7/02;* **B05D** *3/02*

U.S. Cl. 428—36 **14 Claims**

1. A dimensionally heat-recoverable polymeric article having, on at least part of a surface thereof, an adhesive composition that in use is disposed between the article and a substrate onto which the article is to be recovered and that, on recovery of the article, cures by reaction of a plurality of mutually reactive components, the components each having a fusion temperature within the range from 50° to 120° C. and existing separately from one another in the form of solid particles which are mixed together so that the adhesive composition remains substantially uncured during storage of the article and which fuse to bring about curing when the article is heated to recover it onto the substrate.

2. An article as claimed in claim 1, which is in the form of a tube and is coated with the adhesive composition on at least part of its inner surface.

4,707,389

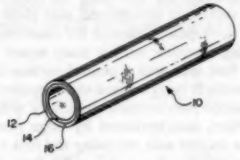
MULTILAYER TUBE, ASSEMBLY AND METHOD

James R. Ward, Crystal Lake, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Sep. 30, 1983, Ser. No. 537,758

Int. Cl.[4] D32B *7/02*

U.S. Cl. 428—36 **8 Claims**

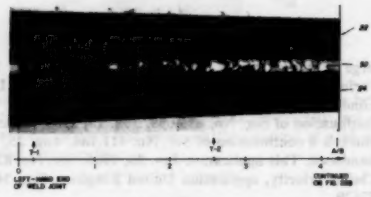


1. A multilayered tube securable to a container constructed from ethylene-vinyl acetate the multilayered tube comprising an outer layer comprising ethylene-vinyl acetate for bonding the multilayered tube to the ethylene-vinyl acetate container, an inner layer comprising polyvinyl chloride for bonding to polyvinyl chloride material and a bonding layer between said outer and inner layers for bonding and preventing delamination of said inner and outer layers.

4,707,390
THERMOPLASTIC STRAP WELD WITH ENCAPSULATED CAVITIES

Nelson Cheung, Arlington Heights, Ill., assignor to Signode Corporation, Glenview, Ill.

Continuation-in-part of Ser. No. 871,693, Jun. 6, 1986. This application Jul. 2, 1986, Ser. No. 881,112
Int. Cl.[4] B32B *5/18*
U.S. Cl. 428—57 18 Claims

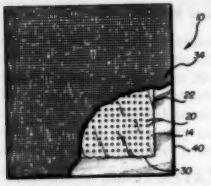


1. A welded joint between two overlapping face-to-face portions of oriented crystalline thermoplastic strap, said joint comprising an elongated substantially amorphous region unitary with a contiguous crystalline region of each said overlapping strap portions, said amorphous region defining a plurality of closed cavities distributed at least in end portions of said amorphous region.

4,707,391
VEHICLE BODY SURFACE REPAIR PATCH ASSEMBLY

Dennis Hoffmann, Sr., Hoffman Estates, Ill., assignor to Pro Patch Systems, Inc., Hoffman Estates, Ill.

Filed Jan. 27, 1987, Ser. No. 6,881
Int. Cl.[4] B32B *35/00*
U.S. Cl. 428—63 16 Claims



1. An improved vehicle body surface repair patch assembly suitable for use in conjunction with a vehicle body surface repair compound, said vehicle repair patch assembly comprising:

a thin, relatively rigid, flexible and deformable plate which is sufficiently bendable for matching the contours of the vehicle body surface to be repaired, said plate containing a plurality of perforations therein for receiving, supporting and holding a vehicle surface body repair compound and having a first side with a central surface thereon for covering the vehicle body surface to be repaired, a periphery for disposition into intimate proximity with the vehicle body surface, and bordered by edge portions, said plate having a second side opposing the first side;

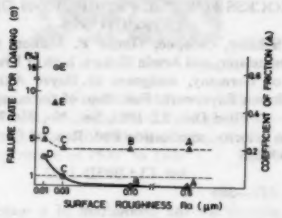
adhesive coating means disposed on the first side of said plate and on at least a substantial portion of the periphery thereof for firmly bonding the periphery in intimate proximity to the vehicle body surface to be repaired; and

mesh means secured at the interior surface thereof to the second side of said plate for receiving, supporting and holding a vehicle body surface repair compound therein to dispose said mesh means in substantially matching contoured relationship to the vehicle body surface to be repaired.

4,707,392
FLEXIBLE MAGNETIC DISK

Mikihiko Kato; Yasutoshi Okuzawa; Shigeo Komine, and Kazuhiko Morita, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 28, 1985, Ser. No. 706,568
Claims priority, application Japan, Feb. 29, 1984, 59-38260; Feb. 29, 1984, 59-38261
The portion of the term of this patent subsequent to Apr. 8, 2003, has been disclaimed.
Int. Cl.[4] G11B *5/72*
U.S. Cl. 428—65 36 Claims

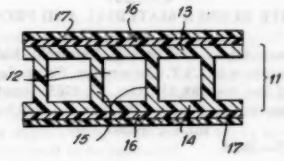


1. A flexible magnetic disk with a hole formed only in a center thereof and with a protective layer formed around said hole, the improvement wherein said protective layer is made of a composition containing a compound which has an acrylic or methacrylic acid ester bond at one or both of a main chain terminal and a side chain thereof and is cured by radiation, a thickness of said protective layer being 30 microns or less and wherein a surface irregularity of said protective layer is 0.03 microns or more represented in terms of a central line average roughness at a cutoff of 0.25 mm.

4,707,393
METHOD FOR MAKING HOLLOW MULTILAYER MULTIPLE-WALL SYNTHETIC RESIN PANELS

Heinz Vetter, Rossdorf, Fed. Rep. of Germany, assignor to Röhm GmbH, Darmstadt, Fed. Rep. of Germany

Filed Nov. 18, 1983, Ser. No. 552,924
Claims priority, application Fed. Rep. of Germany, Dec. 4, 1982, 3244953
Int. Cl.[4] B29C *47/06*; B32B *3/12, 27/36, 31/30*
U.S. Cl. 428—178 2 Claims

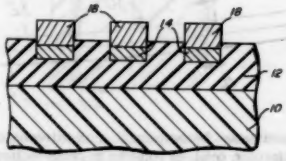


1. A method for making a hollow multilayer multiple-wall synthetic resin panel which comprises extruding a plurality of adhesively bonded layers of thermoplastically extrudable synthetic resins into a multilayer strand consisting of (1) a core layer of polycarbonate resin having a plurality of continuous hollow chambers and, on at least one outer side of said core layer, (2) a UV absorption layer of a syntheitic resin containing from 2 to 15 weight percent of a volatile UV absorber, and on that side of said absorption layer facing away from said core layer, (3) a cover layer containing less than 2 weight percent of a volatile UV absorber; and further processing said strand in a vacuum forming channel after extrusion.

4,707,394
METHOD FOR PRODUCING CIRCUIT BOARDS WITH DEPOSITED METAL PATTERNS AND CIRCUIT BOARDS PRODUCED THEREBY

Peter R. Chant, Burlington, Canada, assignor to Firan Corporation, Oakville, Canada

Filed Sep. 19, 1986, Ser. No. 909,256
Int. Cl.[4] H05K *1/00*; B32B *3/00*; C23F *1/02*; B29C *37/00*
U.S. Cl. 428—209 **24 Claims**



19. In a circuit board, the combination comprising:

(a) a resinous substrate;

(b) an intermediate coating on one surface of said substrate of about 0.0005–0.015 inch and containing a rubber component and an epoxy polymer which have interacted to provide a matrix of the interacted rubber/epoxy polymer, said rubber component comprising at least 35 percent by weight of said coating; and

(c) a metal conductive pattern on said coating providing a circuit, said conductive pattern having a base layer which microformations at the interface with said coating and extending thereinto, said conductive pattern being embedded in said coating to a depth of at least 10 percent of its thickness, said coating being firmly bonded to said metal layer and thereby through said coating to said substrate.

4,707,395
HEAT-SENSITIVE TRANSFERRING RECORDING MEDIUM

Seiji Ueyama, Hirakata, and Hiroyasu Onoe, Ikoma, both of Japan, assignors to General Company Limited, Osaka, Japan

Filed Jul. 29, 1985, Ser. No. 760,032
Claims priority, application Japan, Mar. 12, 1985, 60-47442
Int. Cl.[4] B32B *7/02*
U.S. Cl. 428—212 **4 Claims**

1. A heat-sensitive transferring recording medium which comprises a substrate, a heat-sensitive releasing layer overlying the substrate, a coloring agent layer overlying the heat-sensitive releasing layer, and a heat-sensitive cohesive layer overlying the coloring agent layer, wherein

the heat-sensitive releasing layer is easily melted when heated and has a low melt viscosity, the coloring agent layer does not melt or has a high melt viscosity, and the heat-sensitive cohesive layer becomes cohesive when heated and has a melt viscosity the value of which is between that of the heat-sensitive releasing layer and that of the coloring agent layer.

4,707,396
LAMINATES

Joachim Wank, Dormagen; Werner Waldenrath, Cologne; Heinz Schmitz, Dormagen, and Günter Pakulat, Kuerten, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Aug. 1, 1986, Ser. No. 891,573
Claims priority, application Fed. Rep. of Germany, Aug. 10, 1985, 3528812
Int. Cl.[4] B32B *27/40*
U.S. Cl. 428—216 **6 Claims**

1. A laminate with a thickness of 0.5 mm to 20 mm, comprising layers (A) to (D) in the sequence (A) to (D) wherein:

(A) is a 0.02 mm to 0.8 mm thick film of a thermoplatic;

(B) is a polyurethane layer 2 to 80 μm thick which is tack-free at room temperature and which is the reaction product of (i) 2,4- and/or 2,6-diisocyantotoluene, 4,4'-diisocyanato-diphenylmethane, isophorone diisocyanate, 1,5-diisocyanato-naphthalene or mixtures thereof, with (ii) a polyester-diol in the molecular weight range ($\overline{M}w$ of 1,000 to 4,000 on adipic acid and a glycol which is ethylene glycol, 1,4-dihyroxybutane, 1,6-dihydroxyhexane, or mixtures thereof, and wherein (i) and (ii) have an NCO-/OH equivalen ratio of (0.9:1) to (1:1.1);

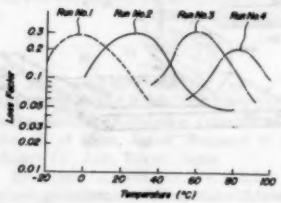
(C) is a color layer; and

(D) is a thermoplatic layer with a thickness of 0.4 mm to 19 mm.

4,707,397
VIBRATION DAMPING METAL PANELS

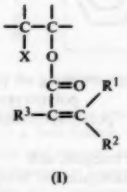
Yasuhiro Morimura, Kunitachi; Yukio Fukuura, Kawagoe; Hikaru Ishikawa, Kokubunji; Itsuo Tanuma, Sayama, and Toshio Honda, Akigawa, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed May 15, 1985, Ser. No. 734,217
Claims priority, application Japan, May 21, 1984, 59-100600; May 31, 1984, 59-109721
Int. Cl.[4] B32B *7/02*
U.S. Cl. 428—216 **4 Claims**

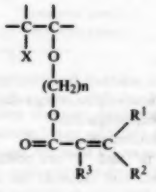


1. A vibration damping metal panel comprising two metal plates and an intermediate layer interposed therebetween, wherein said intermediate layer is composed of:

(A) 1–90% by weight of at least one rubbery polymer having in its molecule an α,β-unsaturated carboxylate group represented by the following general formula:



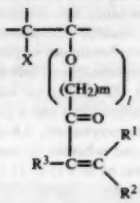
(I)



(II)

or

-continued



(III)

wherein X is a halogen atom selected from the group consisting of Cl, Br and I, each of R^1, R^2 and R^3 is a hydrogen atom or a hydrocarbon residue having a carbon number of 1–10, n is an integer of 2–5, m is an integer of 1–4 and l is an integer of 1–30, and

(B) 99–10% by weight of a substance selected from polymerizable monomers and mixtures thereof,

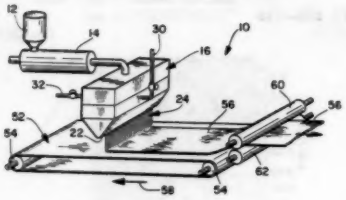
and wherein said intermediate layer is cured by heating.

4,707,398

ELASTIC POLYETHERESTER NONWOVEN WEB

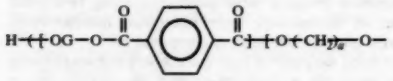
Lavada C. Boggs, Marietta, Ga., assignor to Kimberly-Clark Corporation, Neenah, Wis.

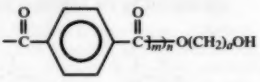
Filed Oct. 15, 1986, Ser. No. 912,287
Int. Cl.[4] D03D *3/00*; D04B *1/00*; B04H *3/00*
U.S. Cl. 428—224 **26 Claims**



1. Elastic meltblown microfibers comprising:

a polyetherester material having the general formula of:





where

"G" is selected from the group consisting of: poly(oxyethylene)-alpha,omega-diol poly(oxypropylene)-alpha,omega-diol poly(oxytetramethylene)-alpha,omega-diol and

"a", "m" and "n" are positive integers; and

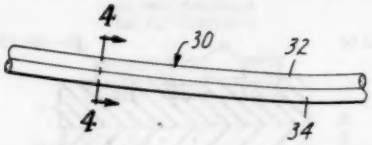
wherein said material has an elongation at break of from about 600 percent to 750 percent when measured in accordance with ASTM D-638 and a melt point of from about 350° F. to about 400° F. when measured in accordance with ASTM D-2117.

4,707,399

BICOMPONENT CERAMIC FIBERS

George M. Rambosek, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Dec. 13, 1985, Ser. No. 809,065
Int. Cl.[4] B32B *9/00*; D02G *3/00*; D03D *3/00*
U.S. Cl. 428—225 **19 Claims**



1. A continuous, bicomponent, non-vitreous ceramic fiber which is circular, oval, or rod-like in cross-section comprising two ceramic components in a longitudinally-extending side-by-side relationship wherein each of the components is derived from a different compatible fiber-forming aqueous-based ceramic precursor liquid, and wherein said components are independently selected from the group consisting of titania, alumina-chromia metal (IV) oxide, alumina-silica, thoria-silica metal (III) oxide, alumina-boria, alumina-boria-silica, zirconia-silica, and combinations thereof.

4,707,400

THICKENING OF WATER-COAGULABLE SOLVENT COATING SOLUTIONS

Donald R. Towery, Pleasant Garden, N.C., assignor to Burlington Industries, Inc., Greensboro, N.C.

Filed Sep. 3, 1986, Ser. No. 903,130
Int. Cl.[4] B32B *7/00*
U.S. Cl. 428—260 **5 Claims**

1. A process of making a waterproof, water vapor permeable coated fabric having a microporous polyurethane layer thereon formed by the wet coagulation method, said process comprising applying a water-miscible, polar organic solvent solution of a polyurethane elastomer to a base fabric, immersing the thus-coated base fabric into an aqueous coagulation bath to extract the solvent from the polymer solution leaving a porous polyurethane matrix adhered to the base fabric, then washing and drying the coated fabric to produce a microporous, water vapor permeable polyurethane layer thereon,

the improvement in which the polar organic solvent solution of polyurethane elastomer contains an acrylic acid thickener the polyurethane elastomer coating, when applied to the base fabric, has a viscosity of at least 500 cps, and the resulting microporous polyurethane layer has a moisture vapor transmission rate of at least 600 grams/square meter/ 24 hours and a hydrostatic pressure resistance of at least 10 psi.

4,707,401

REFRIGERATOR CABINET CONSTRUCTION

Arthur E. Benford, German Township, Vanderburgh County, Ind., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Dec. 12, 1986, Ser. No. 940,928
Int. Cl.[4] F25D *23/08*; B32B *5/20, 7/06*
U.S. Cl. 428—317.5 **9 Claims**

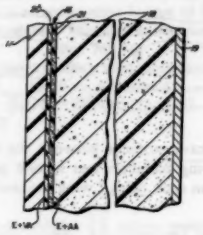
1. An insulative cabinet wall structure for use in refrigeration apparation and the like, said wall structure comprising:

a first wall element defining a first surface portion;

a second wall element formed of a synthetic resin defining a second surface portion in spaced juxtaposition to said first surface portion of the first wall;

a laminate bonding film having a third surface portion peelably bonded to said second surface portion of the second

wall, and an opposite fourth surface portion formed of a material different from the material of which said third surface portion of the bonding film is formed; and



foamed-in-situ polyurethane foam firmly bonded to said first surface portion of the first wall element and said fourth surface portion of said bonding film.

4,707,402

FORMATION OF LAMINATED STRUCTURES BY SELECTIVE DIELECTRIC HEATING OF BONDING FILM

Agmund K. Thorsrud, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 11, 1985, Ser. No. 786,909

Int. Cl.[4] B32B *15/00, 31/00;* **B05D** *3/02*

U.S. Cl. 428—328 **13 Claims**

1. A laminate comprising:

at least two sheets wherein at least one of the sheets compriss a poly(arylene sulfide) resin;

a bonding film intermediate the sheets so as to bond the sheets together;

wherein of the sheets and bonding film only the bonding film is radio frequency sensitized.

4,707,403

MAGNETIC RECORDING MEDIUM HAVING AN IMPROVED MAGNETIC RECORDING LAYER

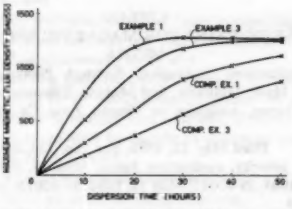
Hirokazu Moriizumi; Akira Horiguchi, and Isao Sasaki, all of Mito, Japan, assignors to Victor Company of Japan, Ltd., Japan

Filed Jul. 21, 1986, Ser. No. 892,383

Claims priority, application Japan, Jul. 22, 1985, 60-160264

Int. Cl.[4] G11B *5/708*

U.S. Cl. 428—328 **6 Claims**



1. A magnetic recording medium which comprises a non-magnetic support and a magnetic recording layer formed on at least one side of the support, said magnetic recording layer being made of a dispersion of an acicular magnetic powder, a magnetic ferrite powder of a hexagonal system having an axis of easy magnetization along the c axis and a titanium monoxide powder in a resin binder in an amount sufficient to form a continuous film, the titanium monoxide powder having an average size of from 0.01 to 5 micrometers and being used in an amount of from 0.1 to 20 wt % based on the total amount of the acicular magnetic powder and the magnetic ferrite powder.

4,707,404

THERMAL TRANSFER RECORDING MATERIAL

Sadao Morishita, Ibaraki; Toshihiko Matsushita, Tokyo, and Mikiya Sekine, Warabi, all of Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

Filed Mar. 28, 1985, Ser. No. 717,139

Claims priority, application Japan, Apr. 3, 1984, 59-67276; May 21, 1984, 59-103169

Int. Cl.[4] B41M *5/26*

U.S. Cl. 428—335 **9 Claims**

1. A thermal transfer recording material comprising a thin substrate and a thermal transfer ink layer provided on the upper side of the substrate, wherein the thin substrate is a polyethylene film having a density of 0.935 or higher.

4,707,405

CYANAMIDE SALTS OF NON-LEAD METALS AS CORROSION INHIBITIVE PIGMENTS IN MIRROR BACK COATINGS

Elaine L. Evans, Pittsburgh, Pa.; James E. Graham, Marietta, Ga., and Alan B. Weissberg, Pittsburgh, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jan. 2, 1985, Ser. No. 815,615

Int. Cl.[4] B32B *15/08, 17/06*

U.S. Cl. 428—336 **9 Claims**

1. An article comprising a thin metallic film attached to a glass substrate and a layer of a hardened composition including an organic film-forming resin and a cyanamide salt of a non-lead metal applied to the thin metallic film wherein the composition inhibits degradation of the thin metallic films, the thin metallic film of a metal selected from the group consisting of silver and copper and having a thickness of up to about 1500 Angstroms.

4,707,406

THERMAL TRANSFER RECORDING MEDIUM

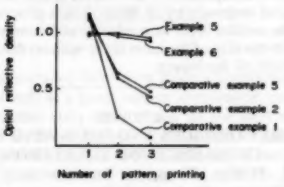
Yoshihiro Inaba; Kunihiro Koshizuka; Tatsuichi Maehashi, and Takao Abe, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Dec. 31, 1985, Ser. No. 815,249

Claims priority, application Japan, Jan. 12, 1985, 60-2642; Jan. 12, 1985, 60-2643; Jan. 22, 1985, 60-8447

Int. Cl.[4] B41M *5/26*

U.S. Cl. 428—336 **32 Claims**



1. A thermal transfer recording medium comprising (i) a suppoort, (ii) a heat-fusible colorant layer and (iii) adhesion layer between said support and said colorant layer; said adhesion layer containing at least one resin selected from the group (A) consisting of a polyurethane resin, a phenoxy resin, a polyester resin and a polycarbonate resin, and at least one copolymer selected from the group (B) consisting of a vinyl acetate copolymer and an acrylate copolymer.

4,707,407

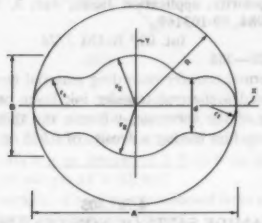
SYNTHETIC WATER-DISPERSIBLE FIBER

John T. Clark, Greenville, and Donald A. Shiffler, Kinston, both of N.C., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 721,347, Apr. 9, 1985, abandoned. This application Mar. 27, 1986, Ser. No. 842,790

Int. Cl.[4] D02G *3/00*

U.S. Cl. 428—361 9 Claims



1. Water-dispersible polyester fiber provided with a water-dispersing coating in sufficient amount to render the fiber water-dispersible, characterized in that the fibers are of scalloped-oval cross-section.

4,707,408

ROLL FOR USE IN BUSINESS MACHINE

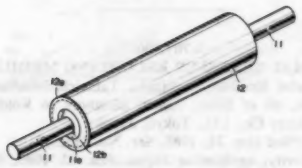
Shigeru Iwasawa, Kamakura, and Takumi Ishiwaka, Yokohama, both of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Mar. 6, 1986, Ser. No. 836,990

Claims priority, application Japan, Mar. 8, 1985, 60-32871[U]

Int. Cl.[4] D02G *3/00*

U.S. Cl. 428—379 4 Claims



1. A roll for use in a business machine comprising: a shaft; and a roll main body disposed at the circumference of said shaft, wherein the roll main body is made of a polyurethane resin comprising a surface layer composed of a skin layer and an inner layer composed of a foam layer which are formed into an integrated structure by an integral skin process so that the foam of the surface layer is gradually and continuously transformed into the skin of the inner layer with no distinct interface between both of the layers.

4,707,409

SPINNERET ORIFICES AND FOUR-WING FILAMENT CROSS-SECTIONS THEREFROM

Bobby M. Phillips, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 29, 1986, Ser. No. 890,270

Int. Cl.[4] D02G *3/00*

U.S. Cl. 428—397 4 Claims

1. A filament comprising a central body section and having a first and second pair of wing members extending from and along the length of said continuous body section, said first pair of wing members projecting from one side of said body section and said second pair of wing members projecting from the opposite side of said body section, said central body comprising about 15% to about 60% of the total mass of the filament and said wing members comprising about 85% to about 40% of the total mass of said filament, said filament further having first

peripheral concave surfaces between the wing members of each pair of wing members and second peripheral concave surfaces between each pair of wing members.

4,707,410

MAGNETIC RECORDING MEDIA

Kotaro Hata, and Eitaro Nakamura, both of Kawasaki, Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan

Filed Sep. 5, 1986, Ser. No. 903,969

Claims priority, application Japan, Sep. 11, 1985, 60-201436; Oct. 11, 1985, 60-226199; Nov. 11, 1985, 60-252285; Mar. 28, 1986, 61-70485; Mar. 28, 1986, 61-70486; Mar. 28, 1986, 61-70487

Int. Cl.[4] G11B *5/702*

U.S. Cl. 428—413 9 Claims

1. A magnetic recording medium comprising a magnetic layer containing an epoxy group-containing vinyl chloride resin having an average degree of polymerization of 100–1000 and an epoxy group content of 0.1 to 20% by weight and at least one additive selected from the group consisting of (1) a phosphoric acid ester compound, (2) a carboxylic acid compound having pKa of 4 or less, (3) a sulfuric acid monoester compound and (4) a sulfonic acid compound wherein the amount of the additive is 0.05 to 5.0 chemical equivalents per chemical equivalent of the epoxy group in the epoxy group-containing vinyl chloride resin.

4,707,411

MAGNETIC PAINT FOR MAGNETIC RECORDING MEDIA

Akira Nakayama, Yokosuka; Katsuya Nakamura, Tokyo; Kotaro Hata, Ichikawa, and Makoto Yamamoto, Hiratsuka, all of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan

Filed May 13, 1985, Ser. No. 733,269

Claims priority, application Japan, May 11, 1984, 59-93011; May 11, 1984, 59-93012; May 11, 1984, 59-93013; Aug. 22, 1984, 59-174399

Int. Cl.[4] G11B *5/702*

U.S. Cl. 428—413 24 Claims

1. A magnetic paint for magnetic recording media, said paint comprising a magnetic powder and as a binder therefore, a copolymer resin containing 0.5 to 10% by weight of epoxy groups and 0.1 to 4.0% by weight of sulfur- or phosphorus-containing strong acid groups and having a vinyl chloride unit content of at least 60% by weight and an average degree of polymerization of from 100 to 900.

4,707,412
GLASS HAVING CONTROLLABLE INFRARED TRANSMISSION

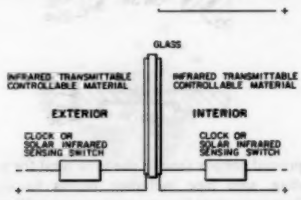
Harry A. Beale, 1307 Windham Dr., Columbus, Ohio 43220

Continuation-in-part of Ser. No. 569,110, Jan. 9, 1984, Pat. No. 4,621,028, which is a continuation-in-part of Ser. No. 481,127, Apr. 1, 1983, abandoned. This application Aug. 15, 1985, Ser. No. 765,762

The portion of the term of this patent subsequent to Nov. 4, 2003, has been disclaimed.

Int. Cl.[4] B05D *5/12, 3/02*

U.S. Cl. 428—432 **5 Claims**



1. A glass sheet provided at least on one side with a coating containing V_2O_3 as its principal ingredient, said V_2O_3 containing a sufficient amount of at least one alloying element so that the transformation temperature of said V_2O_3 is elevated so that said coating will reflect infrared energy when the ambient temperature is above approximately 45° F.–60° F. and will transmit infrared energy when said ambient temperature is below approximately 45° F.–60° F. and wherein said glass sheet is provided on its other side with a coating containing tungsten oxide (WO_2) as its principal ingredient, and means to reflect or transmit infrared energy by permitting an electric current to be transmitted therethrough.

4,707,413
COATING COMPOSITIONS FOR A POLYMER-MODIFIED ROOFING AND WATERPROOFING SHEET

Helmut Kehr, Schermbeck, and Horst Denzel, Marl, both of Fed. Rep. of Germany, assignors to Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Mar. 12, 1986, Ser. No. 838,981

Claims priority, application Fed. Rep. of Germany, Mar. 14, 1985, 3509037

Int. Cl.[4] B32B *11/10, 17/10, 27/02, 27/32*

U.S. Cl. 428—440 **8 Claims**

1. A roofing and waterproofing sheet comprising a fibrous reinforcement sheet, at least one face of which is coated with a waterproofing continuous layer of a bitumen-containing composition comprising, by weight:

(a) 15 to 20% of an amorphous copolymer of propylene, butene-1 and optionally also ethylene, alone or in admixture with up to 40% by weight of atactic polypropylene,

(b) 3 to 5% of an EPDM,

(c) 60 to 82% of a distilled bitumen,

(d) 0 to 3% of an isotactic polypropylene,

(e) 0 to 15% of a conventional filler,

(f) 0 to 1% of an antioxidizing agent,

wherein the EPDM is an ethylene-propylene-ethylidene norbornene terpolymer of the sequence type with 25 to 30% by weight of propylene, 6 to 8 double bonds per 1000C atoms and a green strength of >10 MPa.

8. A roofing and waterproofing sheet according to claim 1, wherein the reinforcement sheet is a polyester or fiber glass mat.

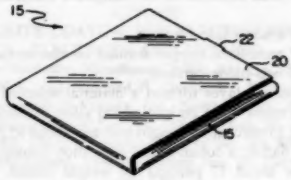
4,707,414
ELECTROSTATIC-FREE PACKAGE

Stuart G. Long, South Laguna, and Michael J. Maciocia, Ontario, both of Calif., assignors to General Dynamics, Pomona Division, Pomona, Calif.

Division of Ser. No. 597,974, Apr. 9, 1984, abandoned. This application Mar. 6, 1986, Ser. No. 836,727

Int. Cl.[4] B32B *23/08, 27/00;* **B62B** *11/52;* **B65D** *23/02*

U.S. Cl. 428—511 **5 Claims**



1. An electrostatic-free package, comprising:

a planar, semi-rigid deformable substrate having a surface with a surface portion for supporting an item to be packaged;

a single layer of resistively anti-static, heat-sealable material including a homogeneous mixture of polyethylene and an organic, anti-static compound, said layer extending over and bonded to said surface.

4,707,415
STEEL STRIPS WITH CORROSION RESISTANT SURFACE LAYERS HAVING GOOD APPEARANCE

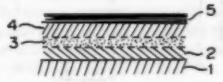
Satoshi Ikeda, and Nobukazu Suzuki, both of Ibaraki, Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka, Japan

Filed Mar. 28, 1986, Ser. No. 845,346

Claims priority, application Japan, Mar. 30, 1985, 60-065020; Mar. 30, 1985, 60-065021

Int. Cl.[4] B32B *15/04*

U.S. Cl. 428—621 **23 Claims**



5. A surface-coated steel strip having improved corrosion resistance as well as a good surface appearance, comprising a steep strip, a zinc alloy layer plated on the steel strip, and a passive-state layer of oxides or hydroxides or sulfides from 0.005 to 1.0 μm thick which is applied on top of the plated zinc layer in which the Zn alloy applied on top of the plated zinc layer in which the Zn alloy applied to the steel strip is selected from the group consisting of:

Zn-Ni alloy containing 10–20% by weight of Ni,

Zn-Co alloys containing 0.5–10% by weight of Co,

Zn-Mo alloys containing 0.5–10% by weight of Mo,

Zn-Fe alloys containing 10–30% by weight of Fe,

Zn-Ni-Co alloys containing 5–20% by weight of Ni+Co,

Zn-Ni-Mo alloys containing 5–20% by weight of Ni+Mo, and

Zn-Ni-Fe alloys containing 5–30% by weight of Ni+Fe.

4,707,416

NON-OXIDE CERAMICS-METAL COMPOSITE MATERIAL

Yoshihiro Ebata, Kawanishi; Ryozo Hayami, Takarazuka; Nobuyuki Tamari, Ikeda; Yasuo Toibana, Osaka, and Makoto Kinoshita, Ikeda, all of Japan, assignors to Agency of Industrial Science and Technology, Tokyo, Japan

Filed Apr. 15, 1985, Ser. No. 723,028

Claims priority, application Japan, Jul. 7, 1984, 59-141192

Int. Cl.[4] B32B *15/04, 15/20, 15/00;* B21D *39/00*

U.S. Cl. 428—627 4 Claims

1. A non-oxide ceramics-metal composite material comprising:

a layer of a non-oxide ceramic;

a layer of metallized copper formed on one surface of said layer of non-oxide ceramic;

an intermediate layer formed a material selected from the group consisting of an iron-nickel alloy consisting essentially of 35 percent by weight iron and about 65 percent by weight nickel, a cobalt-nickel-iron alloy consisting essentially of about 17 percent by weight cobalt, about 29 percent by weight nickel and about 54 percent by weight iron, and copper and bonded on one surface thereof to the free surface of said layer of metallized copper opposite the layer of non-oxide ceramic; and

a layer of iron or an iron alloy bonded to the other surface of said intermediate layer opposite said layer of metallized copper.

4,707,417

MAGNETIC COMPOSITE FILM

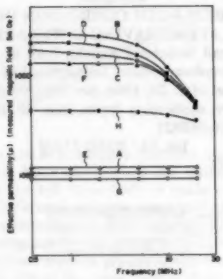
Masatoshi Hayakawa; Koichi Aso; Yoshitaka Ochiai; Hideki Matsuda; Kazuhiko Hayashi; Wataru Ishikawa, and You Iwasaki, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jul. 16, 1985, Ser. No. 755,675

Claims priority, application Japan, Jul. 19, 1984, 59-150429

Int. Cl.[4] C03C *27/02*

U.S. Cl. 428—630 2 Claims



1. A magnetic composite comprising:

a non-magnetic substrate, and

a magnetic thin film structure formed on said substrate, said magnetic thin film structure consisting essentially of a first thin film having high permeability and formed of an Fe—Al—Si alloy containing 82 to 88 weight % Fe, 4 to 7 weight % Al, and 8 to 11 weight % of Si or an Fe—Ni alloy containing 20 to 22 weight % Fe and 78 to 80 weight % Ni, said first thin film being applied by sputtering, and a second thin film having a high saturation magnetic flux density and formed of an Fe—Si alloy containing 92 to 96 weight % Fe and 4 to 8 weight % Si, said second thin film being applied by sputtering after application of said first thin film, the ratio of thickness of the first and second thin films being in the range from 1:0.1 to 2.0.

4,707,418

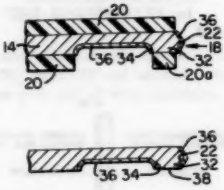
NICKEL PLATED COPPER TAPE

Hem P. Takiar, San Jose; Divyesh P. Shah, Sunnyvale, and Robert E. Hilton, Cupertino, all of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Jun. 26, 1985, Ser. No. 748,876

Int. Cl.[4] C23F *1/00;* H01L *21/92*

U.S. Cl. 428—675 4 Claims



1. An improved copper tape of the type used for tape automated bonding, said tape including beams having bumps formed on their inner ends for connection to metallization pads on a semiconductor die, wherein said bumps each include a bonding surface intended to bond to a metallization pad and a plurality of side surfaces adjacent the bonding surface, said improvement comprising a migration resistant metal layer formed on all side surfaces of the bump but not formed on the bonding surface.

4,707,419

THIN FILM EL DEVICES AND PROCESS FOR PRODUCING THE SAME

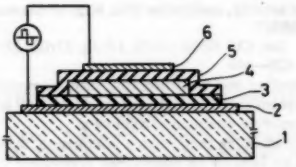
Takashi Ogura; Koichi Tanaka, both of Tenri; Koji Taniguchi; Masaru Yoshida, both of Nara, and Akiyoshi Mikami, Yamatotakada, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed May 27, 1986, Ser. No. 867,814

Claims priority, application Japan, May 28, 1985, 60-116071; Oct. 24, 1985, 60-240163

Int. Cl.[4] B32B *9/04, 17/06*

U.S. Cl. 428—690 13 Claims



1. A thin film electroluminescence device comprising

a substrate;

a first electrode layer on said substrate;

a second electrode layer;

interposed between said first and second electrode layers, an emitting layer comprising a host material having distributed therethroughout atoms of a rare earth element and fluorine atoms, the atom ratio (F/RE) of the fluorine atoms (F) to the rare earth atoms (RE) being between 0.5 and 2.5; and

an insulating layer interposed between said first electrode layer and said emitting layer and said emitting layer and said second electrode layer.

4,707,420

POWER STORAGE BATTERY

Roger J. Wedlake, Johannesburg, South Africa, assignor to South African Inventions Development Corporation, Pretoria, South Africa

Continuation of Ser. No. 750,979, Jul. 1, 1985, abandoned, which is a continuation of Ser. No. 588,240, Mar. 12, 1984, abandoned. This application May 8, 1986, Ser. No. 862,209

Claims priority, application South Africa, Mar. 16, 1983, 83/1837

Int. Cl.[4] H01M *6/36, 10/50*

U.S. Cl. 429—11 19 Claims

1. A power storage battery which comprises a multiplicity of interconnected nominally identical high temperature electrochemical power storage cells whose internal resistances vary with their temperatures, the cells being interconnected into a plurality of groups with each group comprising a plurality of the cells at least some of which cells are connected in series and the groups being connected in parallel, the cells being arranged in the battery in a close packed array in positions relative to one another so that the battery in use constantly has a temperature profile dictated by said positions whereby at least some of its cells are constantly at different temperatures from others, the cells of each group being located and interconnected so that, in use, each group comprises at least some cells which are constantly at different temperatures from others but so that each group has substantially the same internal resistance as each other group due to the temperature profiles of the groups from heat generated in the battery during use.

4,707,421

SPIRALLY WOUND ELECTROCHEMICAL CELLS

James B. McVeigh, Jr., Norwood; Terrence F. Reise, Sudbury, and Alwyn H. Taylor, Wellesly Hills, all of Mass., assignors to Duracell Inc., Bethel, Conn.

Filed May 2, 1985, Ser. No. 729,727

Int. Cl.[4] H07M *4/00*

U.S. Cl. 429—94 14 Claims

1. A spirally wound electrochemical cell having improved abuse resistance comprising a container having therein a cathode, an anode consisting essentially of an anode metal comprising an alkali or alkaline earth metal, a separator, and a fluid electrolyte all in operative association with each other; each of said cathode, anode and separator having lengths substantially greater than their respective widths; and said anode, cathode and separator being spirally wound with said separator being positioned to maintain said anode and said cathode out of direct contact with each other, wherein said anode is comprised of first and second sections integral with each other but subject to different rates of utilization during discharge of said cell with said first section of anode being a minor part of said anode and being substantially completely discharged and depleted, during discharge of said cell, prior to completion of discharge and depletion of said second section of anode, with said second section comprising a major portion of said anode, and wherein said cell further comprises an anode tab located on said second section of the anode, whereby said discharge and depletion of said first section does not prematurely end the life of said cell.

4,707,422

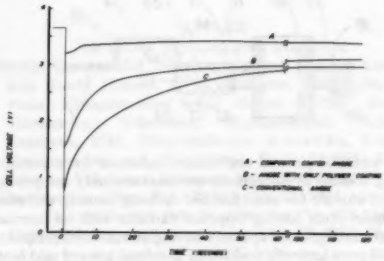
COMPOSITE COATING FOR ELECTROCHEMICAL ELECTRODE AND METHOD

John P. de Neufville, Mendham; Dalbir Rajoria, Glengardner, both of N.J., and Stanford R. Ovshinsky, Bloomfield Hills, Mich., assignors to Voltaix, Inc., North Branch, N.J.

Continuation-in-part of Ser. No. 769,857, Aug. 26, 1985, Pat. No. 4,624,902, which is a continuation of Ser. No. 507,752, Jun. 27, 1983, abandoned. This application Jun. 10, 1986, Ser. No. 872,730

Int. Cl.[4] H01M *4/02, 10/36*

U.S. Cl. 429—48 36 Claims



1. A coated electrode which is capable of electrochemically releasing an active species to a nonaqueous electrolyte in an electrochemical cell, said electrode comprising:

an electrode body comprising active species material, said active species material comprising at least one element selected from the group consisting of hydrogen, lithium, sodium, potassium, magnesium and calcium, for storing said active species and subsequently discharging at least a portion of such stored active species to provide a supply of electrons;

a composite coating over said electrode body comprising a non-metallic, inorganic, ionically conductive active species layer forming a coating over said electrode body for reducing passivation of said electrode body, said active species layer comprising said active species material present in said electrode body, at least one electronegative element selected from the group consisting of fluorine, iodine, bromine, chlorine, sulfur, nitrogen and oxygen and at least one amphoteric element and a polymer layer over said inorganic layer for maintaining the mechanical integrity of said inorganic layer.

4,707,423

ELECTRIC STORAGE BATTERY AND PROCESS FOR THE MANUFACTURE THEREOF

Ilmar L. Kalnin, Millington, and Harris A. Goldberg, Colonia, both of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Jun. 10, 1982, Ser. No. 387,075

Int. Cl.[4] H02M *6/36*

U.S. Cl. 429—112 11 Claims

1. An electric storage battery comprising:

(a) a non-aqueous electrolyte containing charge-transporting positive ions and negative ions wherein said positive ions and negative ions are capable of intercalating graphitic carbon; and

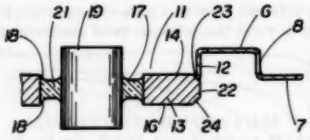
(b) a cathode and an anode comprising graphitic carbon having a configuration selected from the group consisting of fibrous graphitic materials, particulate graphitic materials, and mixtures thereof, wherein said cathode and anode are capable of being simultaneously intercalated with said positive ions and negative ions respectively.

4,707,424

TERMINAL PIN AND END CLOSURE STRUCTURE FOR CHAMBER DEFINING HOUSING OF HERMETIC TERMINAL ASSEMBLY AND METHOD OF MANUFACTURE

Benjamin Bowsky, Maineville; Glenn A. Honkomp, Loveland; Larry G. Burrows, Cincinnati, and Edward E. Wilson, Milford, all of Ohio, assignors to Emerson Electric Co., St. Louis, Mo.

Filed Sep. 19, 1986, Ser. No. 909,301
Int. Cl.[4] H01M 2/30
U.S. Cl. 429—181 **10 Claims**



1. A terminal pin and end closure structure for a chamber defining housing of an hermetic terminal assembly comprising:

an end closure for said chamber defining housing including a main body having opposed surfaces with an aperture therethrough, said aperture having an extended peripheral wall preselectively positioned to extend toward said housing chamber when said end closure is assembled therewith, said peripheral wall surrounding said aperture and extending at a preselected angle to said main body for a preselected distance with the extremity of said extended peripheral wall portion presenting inner and outer edges;

an eyelet geometrically sized to conform with the overlap the entirety of said inner edge of said extending peripheral wall in cooperative sealed relation therewith to totally cover said aperture, said eyelet having opposed faces with an aperture disposed therethrough; and,

a terminal pin sealed in said aperture of said eyelet to extend beyond said opposed faces of said eyelet.

4,707,425

OPTICAL RECORDING METHOD AND MEDIA THEREFOR

Katsuyoshi Sasagawa; Kunio Nishihara, both of Yokohama; Hiroshi Ozawa, Isehara, and Masao Imai, Yokohama, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Japan

Continuation of Ser. No. 553,066, Nov. 18, 1983, abandoned. This application Jun. 26, 1986, Ser. No. 879,827
Int. Cl.[4] G03C 5/16
U.S. Cl. 430—21 **12 Claims**

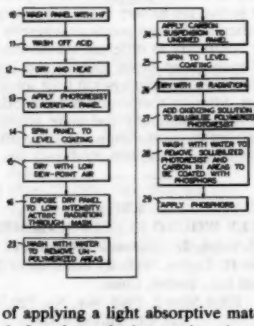
1. A method for reading optically recorded information which comprises: (a) providing a recording layer containing a recording substance selected from the group consisting of aromatic diamino-metal complexes, aromatic dithiol-metal complexes, aliphatic dithiol-metal complexes, mercaptophenol-metal complexes, arylaminium salts and bis (diiminosuccinonitrilo)-metal complexes, which substance has an absorption maximum in the visible and near infrared wavelength region of 600 to 1200 nm and loses or diminishes its power to absorb visible or near infrared radiation in said wavelength region upon exposure to ultraviolet radiation, X-rays, and electron beam or an ion beam; (b) irradiating diesired locations of said recording layer with ultraviolet radiation having a wavelength substantially not greater than 450 nm to form a substantially smooth and pitless pattern based on the presence pr absence or variation in strength of the power to absorb visible or near infrared radiation in said wavelength region thereby recording information in said recording layer; (c) illuminating said pattern with laser light having a wavelength in said visible or near infrared region and (d) detecting the presence or absence or variation in intensity of absorption of said laser light to read the recorded information.

4,707,426

RADIATION EXPOSURE METHOD OF MANUFACTURING A COLOR CATHODE RAY TUBE HAVING LIGHT ABSORPTIVE AREAS

Robert E. Dodds, San Diego; David S. Goodwin, Poway, and Himanshu M. Patel, Escondido, all of Calif., assignors to Sony Corporation, Tokyo, Japan

Filed Feb. 4, 1986, Ser. No. 826,024
Int. Cl.[4] G03C 5/00; H01J 9/227
U.S. Cl. 430—25 **10 Claims**


WASH PANEL WITH HF
WASH OFF ACID
DRY AND HEAT
APPLY PHOTORESIST TO BORATING PANEL
SPIN PANEL TO LEVEL COATING
DRY WITH LOW DEW-POINT AIR
EXPOSE DRY PANEL TO LOW INTENSITY ACTINIC RADIATION THROUGH MASK
WASH WITH WATER TO REMOVE UN-POLYMERIZED AREAS
APPLY CARBON SUSPENSION TO UNDRIED PANEL
SPIN TO LEVEL COATING
DRY WITH IR RADIATION
ADD DEVELOPING SOLUTION TO DISSOLVE POLYMERIZED PHOTORESIST
WASH WITH WATER TO REMOVE SOLUBILIZED PHOTORESIST AND CARBON IN AREAS TO BE COATED WITH PHOSPHORS
APPLY PHOSPHORS

1. A process of applying a light absorptive material to the surface of a panel of a color cathode ray tube prior to receiving a pattern of color phosphors which comprises:

coating a reciprocity-failing photoresist composition including a bisazide having a linking stilbene group onto the inner surface of said panel to form a photoresist layer,

drying the resulting layer with a stream of air having a dewpoint not in excess of about −20° C.,

exposing said layer to actinic radiation wherein said radiation passes through a mask leaving a pattern which blocks portions of said radiation to provide insoluble polymerized areas in those areas which receive said radiation,

developing the exposed layer with a developing solution to remove unpolymerized areas while leaving the polymerized areas of said layer on said panel,

immediately after developing, and without drying the previously wetted surface, coating the entire panel containing said polymerized areas with aqueous suspension of light absorptive material,

drying the coating of light absorptive material, and

removing the polymerized areas and light absorptive material overlying the polymerized areas thereby leaving the light absorptive material in areas where unpolymerized areas were once located on said panel.

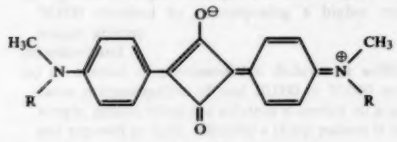
4,707,427

SQUARYLIUM COMPOUND IN AN ELECTROPHOTOGRAPHIC ELEMENT

Hiroyuki Tanaka; Seki Kin, and Lyong S. Pu, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 744,853, Jun. 14, 1985, abandoned, which is a division of Ser. No. 682,211, Dec. 17, 1984, Pat. No. 4,700,001. This application Dec. 29, 1986, Ser. No. 946,641
Claims priority, application Japan, Dec. 16, 1983, 58-236201; Dec. 21, 1983, 58-239815; Dec. 21, 1983, 58-239816
Int. Cl.[4] G03G 5/06, 5/14
U.S. Cl. 430—59 24 Claims

1. A photoreceptor for electrophotography, comprising an electroconductive support and a light-sensitive layer comprising the squarylium compound of general formula (I):



(I)

wherein R is $—C_2H_4X$, wherein X is a hydroxyl group, a halogen atom or the group $—OR_1$ wherein R_1 is an alkyl group having 1 to 6 carbon atoms, or a substituted or unsubstituted phenyl group.

2. The photoreceptor claimed in claim 1, wherein said light-sensitive layer comprises a charge transport layer and a charge generation layer containing said squarylium compound.

4. The photoreceptor claimed in claim 2, wherein said charge transport layer comprises a charge transport material selected from the group consisting of triarylpyrazoline, triphenylmethane, oxadiazole, tetraphenylbenzidine and trinitrofluorenone and a binder resin.

4,707,428

ELECTROSTATIC LATENT IMAGE DEVELOPING METHOD

Kazuo Terao; Tsutomu Kubo; Nobuo Hyakutake; Hidekiyo Tachibana; Jun-ichi Hama; Touru Teshigawara, and Masashi Kajimoto, all of Ebina, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 688,383, Jan. 2, 1985, abandoned. This application Oct. 14, 1986, Ser. No. 918,650
Claims priority, application Japan, May 31, 1984, 59-109737
Int. Cl.[4] G03G 13/22
U.S. Cl. 430—102 5 Claims

1. In a non-contact developing method of developing an electrostatic latent image with toner particles, comprising disposing a development electrode with a gap opposite to a latent image bearing member, said development electrode carrying toner particles layered thereon and said latent image bearing member having a conductive substrate backing-up thereto, and allowing the toner particles on said development electrode to move across said gap from said development electrode to said latent image bearing member to thereby develop the latent image with the toner particles, the improvement comprising:

forming a toner carrying layer having a specific resistance of 10^6 to 10^{12} Ω.cm on said development electrode opposite to said latent image bearing member, said toner carrying layer being formed of a resistive material and having the characteristics defined by $l/\epsilon < 4 \times 10^{-4}$ m where l and ϵ are respectively, the thickness in meters and the specific inductive capacity of the toner carrying layer; and

applying a high-frequency alternating electric field, having a frequency of about 1 to 10 kHz and V_{p-p} of about 400 to 4500 V between said development electrode and said conductive substrate thereby forming a fringing field in a latent image portion of said latent image bearing member whereby the electrostatic latent image is developed with the toner particles in accordance with a pattern of the electrostatic latent image, and wherein the range of the distribution of individual charges of the toner particles is within ±15 μc/g from the mean charge thereof.

4,707,429

METALLIC SOAP AS ADJUVANT FOR ELECTROSTATIC LIQUID DEVELOPER

Torence J. Trout, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 30, 1986, Ser. No. 857,326
Int. Cl.[4] G03G 9/12
U.S. Cl. 430—115 24 Claims

1. An electrostatic liquid developer having improved charging characteristics consisting essentially of

(A) a nonpolar liquid having a Kauri-butanol value of less than 30, present in a major amount.

(B) thermoplastic resin particles having dispersed therein a metallic soap, the resin particles having an average by areas particle size of less than 10μm, and

(C) a nonpolar liquid soluble ionic or zwitterionic charge director compound.

4,707,430

OPTICAL RECORDING MEDIUM

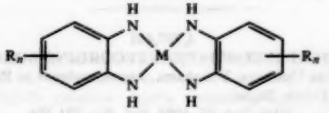
Hiroshi Ozawa, 22-8, Numame 3-chome, Isehara, Kanagawa-ken; Yoichi Hosono, 2070, Iijima-cho, Totsuka-ku, Yokohama, Kanagawa-ken; Sumio Hirose, 1272-97, Kuda-cho, Totsuka-ku, Yokohama, Kanagawa-ken; Katsuyoshi Sasagawa, 1510, Shinyoshida-cho, Kohoku-ku, Yokohama, Kanagawa-ken, and Masao Imai, 11-10, Hashido 1-chome, Seya-ku, Yokohama, Kanagawa-ken, all of Japan

Continuation of Ser. No. 659,347, Oct. 10, 1984, abandoned. This application Feb. 26, 1986, Ser. No. 833,144
Claims priority, application Japan, Oct. 13, 1983, 58-189885
Int. Cl.[4] G03C 5/16
U.S. Cl. 430—270 11 Claims

1. A method of optically recording information which comprises providing an optical recording medium having a recording layer composed of:

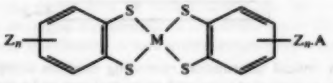
(a) an organometallic complex having an absorption maximum in the wavelength range of 600–1200 nm and being selected from the group consisting of:

(i) aromatic diamine metal complexes of the formula



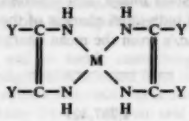
wherein R is a hydrogen or a halogen atom or an alkyl or nitro group, n is an integer of 1 to 4 and M is a nickel, palladium or platinum atom;

(ii) aromatic dithiol metal complexes of the formula



wherein Z is a hydrogen or a halogen atom or an alkyl group, n is an integer of 1 to 4, M is a nickel, palladium or platinum atom and A is a quaternary ammonium group;

(iii) aliphatic diamine metal complexes of the formula

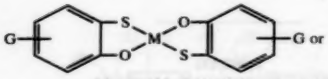


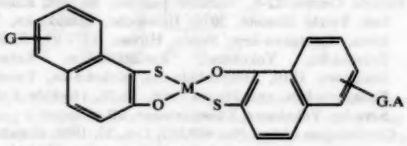
wherein Y is a hydrogen atom or an alkyl or phenyl group and M is a nickel, palladium or platinum atom;

(iv) aliphatic dithiol metal complexes of the formula

wherein E is a hydrogen atom or an alkyl or phenyl group and M is a nickel, palladium or platinum atom; and

(v) mercaptophenol metal complexes of the formulas





wherein G is a hydrogen or a halogen atom or an alkyl group, M is a nickel, palladium or platinum atom and A is a quaternary ammonium group;

(b) a resinous binder; and

(c) a sensitizer capable of generating radicals upon exposure to an ultraviolet ray,

and exposing said recording layer to an ultraviolet ray in the wavelength range of 200–400 nm to diminish the absorption of said metal complexes in the wavelength range of 600–1200 nm at the exposed portion of said layer compared with the unexposed portion thereof, thereby recording information on said recording layer in a substantially pitless form.

4,707,431

OPTICAL INFORMATION RECORDING MEDIUM

Masaakira Umehara, Yokohama, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Filed Oct. 25, 1985, Ser. No. 791,384

Claims priority, application Japan, Nov. 1, 1984, 59-228870

Int. Cl.[4] G03C *1/72, 1/76*

U.S. Cl. 430—271 **2 Claims**

1. An optical information recording medium comprising a substrate provided at least with an underlayer and a monolayer coloring-matter containing recording layer thereon, said underlayer being prepared by curing a light-curable composition of acrylate monomer and/or methacrylate monomer and/or their corresponding oligomer containing an effective amount to impart heat-resistance of a reducing agent selected from the group consisting of monohydroxybenzenes, polyhydroxybenzenes and alkylenebisphenols, and a photo-polymerization initiator selected from the group consisting of substituted and unsubstituted acetophenones, substituted and unsubstituted benzophenones and substituted and unsubstituted thioxanthones.

2. An optical information recording medium according to claim **1**, wherein the photo-polymerization initiator is an acetophenone or thioxanthone.

4,707,432

FERROCENIUM/ALPHA-CLEAVAGE PHOTOINITIATOR SYSTEMS FOR FREE RADICAL POLYMERIZABLE COMPOSITIONS

Leslie R. Gatechair, Katonah; Gary M. Blumenstein, Mahopac, both of N.Y., and Peter J. Schirmann, Fairfield, Conn., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Sep. 23, 1985, Ser. No. 779,343

Int. Cl.[4] G03C *1/68, 1/64*

U.S. Cl. 430—281 **26 Claims**

1. A composition comprising

(a) a material polymerizable by free radical polymerization,

(b) at least one iron compound of the formula I

$$[(R^1)(R^2Fe^{II})_a]^{+a}\frac{q}{q}(X)^{-q} \quad (I)$$

wherein

a is 1 or 2 and q is 1, 2 or 3,

X is halogen, nitrate, sulfate, phosphate, perchlorate or (LQ_m),

L is a divalent to heptavalent metal or non-metal,

Q is a halogen atom,

m is an integer corresponding to the sum of the values of L and q,

R^1 is an unsubstituted or substituted η^6-benzene and

R^2 is an unsubstituted or substituted cyclopentadienyl anion, and

(c) a non-oniun α-cleavage photoinitiator; said components (b) and (c) being present in a combined concentration of from about 0.05–10.0%, by weight of (a), and in weight ratios ranging from 6:1 to 1:4.

11. The composition according to claim **1**, wherein said α-cleavage photoinitiator is selected from the group consisting of acetophenones, ketals, aryl glyoxalates, acylphosphine oxides.

17. The composition of claim **1**, wherein components (b) and (c) are present in respective concentrations of 1.0%, by weight of (a) and are (η^6-isopropylbenzene) (η^5-cyclopentadienyl)iron (II) hexafluorophosphate and 2,2-dimethoxy-2-phenylacetophenone, respectively.

21. A coated material wherein a layer of the composition according to claim **17** is applied to at least one surface of a substrate.

23. A process for the production of photographic relief images, wherein a material according to claim **21** is irradiated through a photomask, and the unexposed parts are then removed.

4,707,433

WATER-SOLUBLE PHOTOSENSITIVE MATERIAL WITH DICHROMATE AND LOW MOLECULAR WEIGHT GELATIN

Kazufumi Ogawa, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 594,432, Mar. 29, 1984, abandoned, which is a continuation of Ser. No. 379,100, May 17, 1982, abandoned. This application Oct. 21, 1985, Ser. No. 788,700

Claims priority, application Japan, May 18, 1981, 56-75236; Aug. 17, 1981, 56-128542; Aug. 20, 1981, 56-131178

Int. Cl.[4] G03C *1/66*

U.S. Cl. 430—289 8 Claims

6. A photosensitive solution which does not gel at 20°–30° C., comprising:

(a) a gelatin having an average molecular weight of 30,000 to 70,000 obtained by decomposing a higher molecular weight gelatin;

(b) water; and

(c) an amount of photosensitive dichromate sufficient to cause polymerization of said 30,000 to 70,000 molecular weight gelatin when the solution is coated on a substrate and exposed to light, whereby a sharp pattern is obtained on development with cold water.

4,707,434

COLOR IMAGE FORMING METHOD COMPRISING PROCESSING WITH A BLEACH-FIXING SOLUTION

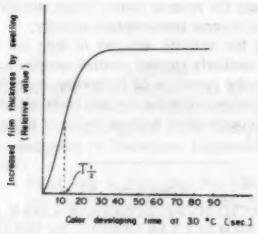
Shigeharu Koboshi, and Moeko Higuchi, both of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Aug. 14, 1985, Ser. No. 765,592

Claims priority, application Japan, Aug. 20, 1984, 59-172995; Aug. 20, 1984, 59-172996; Nov. 5, 1984, 59-233934; Nov. 15, 1984, 59-239465

Int. Cl.[4] G03C *7/00*

U.S. Cl. 430—393 13 Claims



1. A color image forming method, which comprises subjecting a light-sensitive silver halide color photographic material having a photographic constituent layer comprising blue-sensitive, green-sensitive and red-sensitive silver halide emulsion layers and a black colloid silver halation preventive layer on a support and having a total thickness of the photographic constituent layer which is effective for photographic performance of 25 μm or less to imagewise exposure, then carrying out color developing processing of the exposed material in the presence of a dye forming complex and then carrying out bleach-fixing processing of the developed image with a bleach-fixing solution containing at least one organic acid ferric complex.

4,707,435

INDUSTRIAL X-RAY SYSTEM

Thomas D. Lyons, St. Paul, and Peter B. Jamieson, Woodbury, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 267,402, May 26, 1981, abandoned. This application Apr. 13, 1983, Ser. No. 484,518

Int. Cl.[4] G03C *5/17, 1/92*

U.S. Cl. 430—494 9 Claims

1. An industrial radiographic system comprising two high energy particle radiation intensifying screens sandwiching a radiation sensitive element which comprises:

(1) a base,

(2) a decolorizable dye underlayer on at least one side of the base,

(3) a first black-and-white silver halide emulsion layer over said dye underlayer, and

(4) a second black-and-white silver halide emulsion layer on the other side of said base,

wherein both of said silver halide emulsion layers are spectrally sensitized to the wavelength of radiation emitted by said screens when struck by high energy particle radiation and wherein the average size of the silver halide grains in the emulsions are below 0.4 micrometers, at least 75% of the total number of grains are within 0.07 micrometers of the average grain size, both emulsions provide a contrast of greater than 4.0 at an optical density of 2.0, and the element can provide D_{max} of at least 3.5.

4,707,436

COLOR PHOTOGRAPHIC MATERIAL

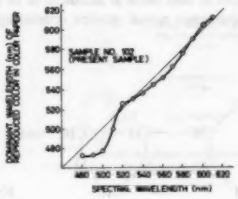
Noboru Sasaki, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 28, 1986, Ser. No. 835,030

Claims priority, application Japan, Feb. 28, 1985, 60-39734

Int. Cl.[4] G03C *7/32*

U.S. Cl. 430—504 24 Claims



1. A silver halide color photographic material having, on a support, one or more cyan coupler-containing red-sensitive silver halide emulsion layers, magenta coupler-containing green-sensitive silver halide emulsion layers, and yellow coupler-containing blue-sensitive silver halide emulsion layers, and additionally having a silver halide emulsion layer which contains at least one cyan coupler and which is spectrally sensitized such that the relation of the maximum sensitivity wavelength λ_{RG} of the spectral sensitivity distribution thereof to the weight averaged wavelength of sensitivity λ_R of the spectral sensitivity distribution of said red-sensitive layer and the weight averaged wavelength of sensitivity λ_G of the spectral sensitivity distribution of said green-sensitive layer satisfies the formulae

$$\lambda_R - \lambda_{RG} \geqq 5 \text{ nm}$$

and

$$\lambda_{RG} - \lambda_G \geqq 5 \text{ nm}.$$

4,707,437

RADIATION-POLYMERIZABLE COMPOSITION AND ELEMENT CONTAINING A PHOTOPOLYMER COMPOSITION

John E. Walls, Hampton; Carlos Tellechea, Shrewsbury, and Major S. Dhillon, Belle Mead, all of N.J., assignors to Hoechst Celanese Corporation, Somerville, N.J.

Division of Ser. No. 762,091, Aug. 2, 1985, Pat. No. 4,652,604. This application Oct. 29, 1986, Ser. No. 924,383

Int. Cl.[4] G03C *1/76*

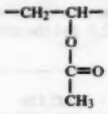
U.S. Cl. 430—523 **20 Claims**

1. A photographic element comprising a substrate having coated thereon a radiation-polymerizable composition, and a transparent, continuous oxygen barrier disposed on said composition, the radiation-polymerizable composition comprising in admixture

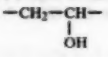
(a) a binder resin having the general formula

—A—B—C—

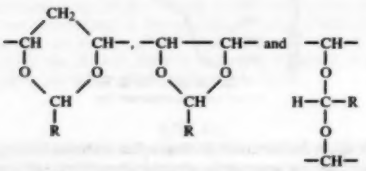
wherein a plurality of each of components A, B and C occur in ordered or random sequence in the resin and wherein A is present in said resin at about 5% to about 20% by weight and comprises groups of the formula



B is present in said resin at about 4% to about 30% by weight and comprises groups of the formula



and C is present in said resin at about 50% to about 91% by weight and comprises acetal groups consisting of groups of the formulae



(I) (II) (III)

where R is lower alkyl or hydrogen, and wherein said group I is present in component C from about 75% to about 85%, group II is present in component C from about 3% to about 5%; and group III is present in component C from about 10% to about 22%;

(b) a photoinitiator; and

(c) a photopolymerizable mixture of

(i) an acrylic monomer having two or more unsaturated groups; and

(ii) an oligomer which is prepared by reacting one molar equivalent of a substantially linear polymeric compound having an active hydrogen group at each end thereof with a least two molar equivalents of a diisocyanate so as to form a prepolymer having an isocyanate group at each end thereof; and subsequently reacting said prepolymer with at least two equivalents of an ethylenically unsaturated compound having an active hydrogen group to provide said prepolymer with unsaturation at each end thereof.

4,707,438

IMMUNOASSAY FOR BREAST CANCER EMPLOYING MONOCLONAL ANTIBODIES

Iafa Keydar, Tel Aviv, Israel, assignor to Tel Aviv University and Teva Pharmaceutical Industries, Limited, both of Tel Aviv, Israel

Continuation of Ser. No. 643,279, Aug. 22, 1984, abandoned. This application Feb. 15, 1985, Ser. No. 702,055

Int. Cl.[4] G01N *33/53, 33/574, 33/577*

U.S. Cl. 435—5 **22 Claims**

3. An immunoassay for diagnosing and monitoring human breast cancer, wherein said immunoassay is characterized by the use of monoclonal antibodies having a high percent accuracy of recognition reaching up to 90% to 100% of all breast metastases, without significant undesirable false positives or cross reactions with malignancies of non-breast origin, comprising:

contacting a sample with first and second antibodies to form an antibody-antigen complex with any human mammary tumor virus contained in said sample, one of said first and second antibodies being detectable and the other being the monoclonal antibody produced and secreted by hybridoma cell line ATCC Accession determining the presence or absence of detectable antibody in said antibody-antigen complex.

4,707,439

SCREENING TEST FOR REVERSE-TRANSCRIPTASE CONTAINING VIRUS SUCH AS NON-A, NON-B HEPATITIS, NANBH

Belinda P. Seto; William G. Coleman, Jr., both of Bethesda, and Robert J. Gerety, Potomac, all of Md., assignors to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Filed Oct. 26, 1984, Ser. No. 665,400

Int. Cl.[4] C12Q *1/00, 1/70*

U.S. Cl. 435—5 **8 Claims**

5. A method for screening a blood composition for the presence of retrovirus particles comprising:

(a) isolating said retrovirus particles from a sample of blood composition;

(b) disrupting or lysing the isolated retrovirus particles to thereby release the reverse transcriptase therefrom;

(c) assaying the reverse transcriptase activity;

(d) comparing the activity assayed in step (c) with that assayed in a similarly treated control sample; and

(e) concluding the presence of retrovirus particles in said blood composition when the reverse transcriptase activity in the blood composition is about twice or more than that in the control.

4,707,440

NUCLEIC ACID HYBRIDIZATION ASSAY AND DETECTABLE MOLECULES USEFUL IN SUCH ASSAY

Jannis G. Stavrianopoulos, New York, N.Y., assignor to Enzo Biochem, Inc., New York, N.Y.

Filed Jan. 30, 1984, Ser. No. 575,396

Int. Cl.[4] C12Q *1/68;* **C08G** *77/04*

U.S. Cl. 435—6 **28 Claims**

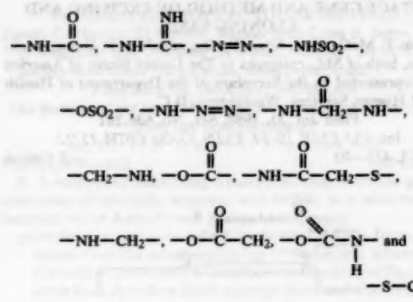
1. A detectable molecule of the formula

$$A^3\text{—}(\text{—X—}R^1\text{—E—Det}^b)_m$$

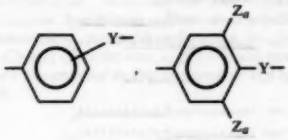
where

A^3 is an oligo- or polynucleotide having at least one modifiable reactive group consisting of amino, hydroxy, cis OH, halide, aryl, imidazoyl, carbonyl, carboxyl, thiol or a residue comprising an activated carbon;

—X— is selected from the group consisting of



—R^1— is



a C_1–C_{10} branched or unbranched alkyl or aralkyl, which may be substituted by —OH;

—Y— is a direct bond to —E—, or —Y— is —E—R^2— where —R^2— is a C_1–C_{10} branched or unbranched alkyl;

Z_a is chlorine, bromine or iodine;

—E— is O, NH or an acyclic divalent sulfur atom;

Det^b is a chemical moiety capable of being detected, comprising biotin or a substituted or unsubstituted metal chelator or a compound capable of yielding a metal chelator; and

m is an integer from 1 to the total number of modified reactive groups on said oligo- or polynucleotide.

28. A nucleic acid hybridization assay comprising hybridizing to a nucleic acid the molecule of any one of claims **1–27**.

4,707,441

BINDING ASSAYS IN AUTOMATED APPARATUS WITH LIPOSOME COMPATIBLE SURFACTANTS

Syed I. Ahmad, Orangeburg, and Eddie Hedaya, Hartsdale, both of N.Y., assignors to Technicon Instruments Corp., Tarrytown, N.Y.

Filed Aug. 6, 1984, Ser. No. 638,596
Int. Cl.[4] G01N *33/53, 33/566, 35/00*
U.S. Cl. 435—7 **32 Claims**

25. A specific binding assay method for use in an automated analysis system for determining the presence of an analyte ligand in a sample, the method comprising the steps of:

contacting the test sample with a composition comprising a binding partner for the analyte ligand; a detection system comprising a first compound and a second compound; a vesicle containing the first compound of said detection system and having incorporated with its surface analyte ligand or analyte ligand analog; a substance which modifies the rupturability or permeability of the medium external to the vesicle; and at least one surfactant which does not modify vesicle rupturability or permeability by the medium external to the vesicle; and observing any detectible response.

4,707,442

HYBRID CELL LINE PRODUCING MONOCLONAL ANTIBODY CYTOLYTIC TO *TRICHOMONAS VAGINALIS*

John F. Alderete, San Antonio, Tex., assignor to Board of Regents, The University of Texas System, Austin, Tex.

Continuation-in-part of Ser. No. 544,473, Oct. 24, 1983. This application Sep. 14, 1984, Ser. No. 650,417
Int. Cl.[4] G01N *33/571;* **C12N** *15/00, 5/00;* **A61K** *39/395*
U.S. Cl. 435—7 **8 Claims**

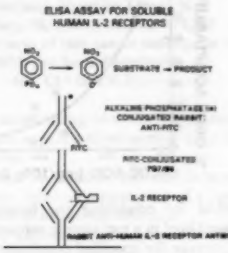
1. A continuous cell line which produces monoclonal antibodies against a membrane glycoprotein antigen of *Trichomonas vaginalis* and said antibodies being cytolytic to *Trichomonas vaginalis* organisms, comprising a hybridoma formed by fusing a cell capable of producing antibodies against *Trichomonas vaginalis* antigen with a myeloma cell, and said hybridoma producing monoclonal antibody specific to and cytolytic against *Trichomonas vaginalis* organisms and specific to the same glycoprotein as the monoclonal antibody produced by the hybridoma ATCC HB 8379.

4,707,443

SOLUBLE INTERLEUKIN-2 RECEPTOR AS A DISEASE INDICATOR AND A METHOD OF ASSAYING THE SAME

David Nelson; William Biddison; Laurence Rubin, all of Bethesda; Warner Greene, Potomac, all of Md.; Warren Leonard, Washington, D.C., and Robert Yarchoan, Bethesda, Md., assignors to The United States of America as represented by the Secretary of the Department of Health and Human Services, Washington, D.C.

Filed Apr. 19, 1985, Ser. No. 724,897
Int. Cl.[4] G01N *33/53, 33/577;* **C12N** *15/00*
U.S. Cl. 435—7 **18 Claims**



1. A method for quantitative determination of soluble interleukin-2 receptor (IL-2R) leveL in a cell free sample comprising the steps of:

(a) coating suitable number of wells in a multiwell microtiter plate with immunoglobulin containing antibody against soluble IL-2R;

(b) washing the wells with a suitable medium to remove excess unbound antibody;

(c) adding a sample of human body fluid suspected of containing soluble IL-2R to the wells and incubating for sufficient time for binding between antibody and said sample to occur;

(d) washing the wells with suitable medium to remove unbound sample;

(e) adding to the wells sufficient amount of fluoresceinisothiocyanate (FITC) modified monoclonal antibody against IL-2R, said monoclonal antibody being different from that in step (a) if the antibody in step (a) is also a monoclonal antibody, incubating for sufficient time for binding between the monoclonal antibody and said sample to occur;

(f) washing the wells with suitable medium to remove unbound FITC modified antibody;

(g) adding to the wells enzyme-conjugated anti-FITC anti-

body and incubating for sufficient time for binding to occur;

(b) washing the wells with suitable medium to remove unreacted anti-FITC antibody and;

(i) adding sufficient amount of suitable substrate for said conjugated enzyme and measuring for resulting product relative to known amounts of IL-2R similarly treated as in steps (a) thru (i) and then determining the level of binding between the soluble receptor and the FITC modified monoclonal antibody by comparing with a control sample or a standard curve.

4,707,444

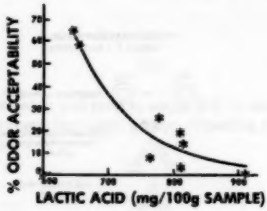
METHOD FOR PREDICTING THE ACCEPTABILITY OF COARSELY GROUND BEEF

A. Douglas King, Jr., Martinez, and Patricia S. Nassos-Stalder, Redwood City, both of Calif., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Jun. 7, 1985, Ser. No. 742,485

Int. Cl.[4] C12Q *1/32, 1/22;* **G01N** *33/12*

U.S. Cl. 435—26 **3 Claims**



1. A method for predicting the future acceptability of coarsely ground beef in a test sample subsequent to regrinding and aerobic storage for specified conditions of time and temperature, which comprises:

(a) setting up a data base which relates initial concentration of lactic acid in coarsely ground beef samples to odor acceptability of said samples after regrinding and aerobic storage for specified conditions of time and temperature by treating as follows:

(i) measuring said initial concentration of lactic acid in said samples of coarsely ground beef;

(ii) regrinding said samples of step (i) to about 4–6 mm and aerobically storing for specified conditions of time and temperature;

(iii) measuring said odor acceptability of said stored samples of step (ii);

(iv) preparting a graphical representation or equation which correlates said initial concentration of lactic acid in said samples with said values for odor acceptability of said stored samples; and

(b) measuring the initial lactic acid in a test sample of coursely ground beef and obtaining a value for odor acceptability of said test sample under said predetermined storage conditions by comparison with the data base prepared in step (a) and predicting the acceptability of said test sample.

4,707,445

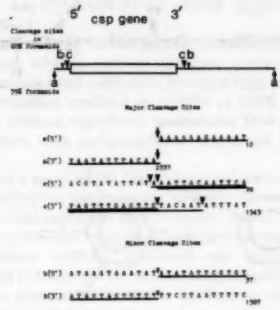
INTACT GENE AND METHOD OF EXCISING AND CLONING SAME

Thomas F. McCutchan, Silver Spring, and John B. Dame, Rockville, both of Md., assignors to The United States of America as represented by the Secretary of the Department of Health and Human Services, Washington, D.C.

Filed Jul. 31, 1984, Ser. No. 636,261

Int. Cl.[4] C12P *19/34;* **C12N** *15/00;* **C07H** *15/12*

U.S. Cl. 435—91 **5 Claims**



1. A process for excising from a genomic DNA a complete sequence for encoding a protein which comprises treating a genomic DNA susceptible to mung bean nuclease and formamide under controlled conditions in a reaction mixture comprising mung bean nuclease and formamide in an amount sufficient for excising in a single step, directly form the genomic DNA, a complete nucleotide sequence encoding a protein when said nucleotide sequence is cloned in a foreign expression vector, said excised nocleotide sequence having therein protein initiation and termination codons.

4,707,446

STABLE HALOPEROXIDASE METHOD

John Geigert, Clayton; Te-Ning E. Liu, Martinez, and Thabiso N'timkulu, Berkeley, all of Calif., assignors to Cetus Corporation, Emeryville, Calif.

Filed May 24, 1983, Ser. No. 497,654

The portion of the term of this patent subsequent to Nov. 17, 2004, has been disclaimed.

Int. Cl.[4] C12P *7/00, 9/00;* **C12N** *9/46*

U.S. Cl. 435—132 **11 Claims**

1. A method of oxidizing a halide selected from the group consisting of chloride, bromide and iodide, to the corresponding hypohalous acid in a haloperoxidase-catalyzed reaction which can be performed, without appreciable haloperoxidase inactivation, at H_2O_2 and hypohalous acid concentrations which produce rapid inactivation of the haloperoxidase derived from *C. fumago,* said method comprising:

providing a non-heme haloperoxidase derived from a selected microorganism, of dematiaceous hyphomycetes which is selected from the genera consisting of Curvularia and Drechslera, and

reacting the haloperoxidase with the selected halide in the presence of H_2O_2, at a pH of between about 4 and 9.

4,707,447

FUNGAL CHLOROPEROXIDASE METHOD

Jennie C. Hunter, El Cerrito; Angela Belt; Lynn S. Sotos, both of Oakland, and Michelle E. Fonda, Albany, all of Calif., assignors to Cetus Corporation, Emeryville, Calif.

Filed May 24, 1983, Ser. No. 497,658

The portion of the term of this patent subsequent to Nov. 17, 2004, has been disclaimed.

Int. Cl.[4] C12P *7/00, 9/00, 7/16;* C12N *9/08*

U.S. Cl. 435—132 15 Claims

1. A method of oxidizxing a halide selected from the group consisting of chloride, bromide, and iodide, at a selected pH between about 4 and 9, said method comprising:

providing an enzxyme which is derived from a fungus selected from the group consisting of the genera Alternaria, Curvularia, Drechslera, Ulocladium, Dendryphiella, Dendrylphion therefore Dichotomophthora and Embellisia in the enteroblastic tretic group or from a dmeatiaaceous hyphomycete fungus selected from the group consisting of the genera Botrytis, Bispora, Cladosporium, Humicola, Stemplyllium, Wardomyces and Epicoccum in the acroauxic holoblastic group, and which is capable of chlorinating monochlorodimedon in the presence of H_2O_2 and chloride ions, at pH 7.0, and reacting the halide with the enzyme in the presence of H_2O_2 at the selected pH.

4,707,448

IMMORTAL LINE OF HUMAN FETAL GLIAL CELLS

Eugene O. Major, Reston, Va., assignor to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Filed Oct. 4, 1984, Ser. No. 657,630

Int. Cl.[4] C12N *5/00, 15/00;* C12R *1/91*

U.S. Cl. 435—240.25 6 Claims

1. A continuous and permanently established line of human fetal glial cell being a eucaryotic host for the growth of human viruses and producing homogeneous astroglial cells.

4,707,449

PICHIA PASTORIS YEAST STRAINS OF ENHANCED TRYPTOPHAN CONTENT

Lucas K. Shay, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jul. 19, 1984, Ser. No. 632,499

Int. Cl.[4] C12N *1/16;* C12P *21/00*

U.S. Cl. 435—255 7 Claims

1. A biologically pure culture of yeast having the identifying characteristics of a *Pichia pastoris* and exhibiting tryptophan producing capability when cultured on a substrate selected from the group consisting of methanol and glucose, wherein said yeast is selected from the group consisting of:

Pichia pastoris A79 (NRRL Y-15251),
Pichia pastoris A150 (NRRL Y-15252),
Pichia pastoris F5-133 (NRRL Y-15253),
Pichia pastoris F10-76 (NRRL Y-15254),
Pichia pastoris F10-211 (NRRL Y-15255), and
Pichia pastoris H-42 (NRRL Y-15256).

4,707,450

SPECIMEN COLLECTION AND TEST UNIT

Frederic L. Nason, 6830 Orion Ave., Van Nuys, Calif. 91406

Filed Sep. 25, 1986, Ser. No. 912,081

Int. Cl.[4] C12M *1/30*

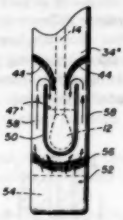
U.S. Cl. 435—295 11 Claims

1. A specimen collection and test unit comprising:

a swab including an elongated hollow swab shank having a swab tip at one end thereof for use in collection of a biological speciment or the like;

a hollow base secured to the opposite end of said swab shank and having at least one reagent therein, said base being formed from a material having sufficient resiliency for manual pressing to pump the reagent within said base through said swab shank to said swab tip for direct contact with the specimen collected on said tip;

a cap removably mounted on said base and enclosing said swab when mounted on said base, said cap defining an open end for receiving said swab and a closed, opposite end defining a well for retaining at least a portion of the reagent pumped to said swab tip in a position with said swab tip immersed within the reagent;



seal means on said cap for substantial sealing with said swab shank at a position above the swab tip when said swab is received through the interior of said cap into said well and to prevent leakage of the portion of the reagent from said well; and

means within said cap for storing an additional reagent and means for selectively delivering said additional reagent to said well.

4,707,451

DETECTION OF RETICULOCYTES

Burton H. Sage, Jr., Raleigh, N.C., assignor to Becton, Dickinson and Company, Franklin Lakes, N.J.

Filed Sep. 18, 1985, Ser. No. 777,355

The portion of the term of this patent subsequent to Feb. 18, 2003, has been disclaimed.

Int. Cl.[4] G01N *1/30*

U.S. Cl. 436—63 3 Claims

1. A process for determining reticulocytes comprising:

(a) staining reticulocytes in a blood sample with chrysaniline to give a mixture;

(b) exciting chrysaniline-stained reticulocytes in said mixture with light energy from an output peak of a laser having a maximum output at about 488 nm; and

(c) detecting said stained reticulocytes and distinguishing them from chrysaniline-stained erythrocytes in said mixture by detecting in a flow cytometer fluorescence emission from said stained reticulocytes at an emission wavelength different from the wavelength of fluorescence emission from said stained erythrocytes.

4,707,452

LABORATORY EVAPORATION

David R. Friswell, Holliston, Mass., assignor to Zymark Corporation, Hopkinton, Mass.

Filed Oct. 26, 1984, Ser. No. 665,456

Int. Cl.[4] B01D *1/14;* B01L *11/00*

U.S. Cl. 436—177 6 Claims

1. A process for recovering solids from liquids by evaporating said liquid until said solids have been converted to a solid composition of a desired state of dryness, said process comprising the steps of:

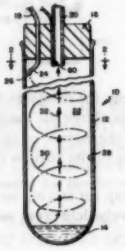
(a) placing a liquid composition containing said solids and said liquid in a tubular receptacle;

(b) causing drying gas to flow into said receptacle through an inlet to said tubular receptacle which inlet directs the flow of said drying gas in a generally helical flow pattern from a position in said tubular receptacle which is remote from said liquid composition around and downwardly

along the wall of said tubular receptacle and thence into intimate contact with said liquid composition, to remove moisture therefrom; and

(c) then removing moisture-bearing drying gas through an internal path, generally within said helical flow gas pattern of said incoming drying gas, and through an outlet conduit positioned at the axis of said helical flow pattern and near the top of said tubular receptacle, thereby avoiding dilution of said moisture bearing drying gas being removed by said incoming drying gas and maintaining a significant temperature difference between the incoming drying gas and the moisture-hearing drying gas being removed during said evaporating process.

4. Apparatus for isolating solids from liquids by evaporating said liquid, said apparatus comprising:



(1) a tubular vessel having an opening only at the top thereof and forming means to hold a liquid composition to be dried to a suitably dry state near the bottom thereof;

(2) a closure means closing said opening;

(3) a first supply conduit means through said closure means and positioned near the top of said vessel for conveying drying gas through said opening into said tubular vessel in a helical path along the interior wall thereof and into contact with said composition being dried;

(4) a second conduit means located in said closure means at a location on the axis of said helical path to remove said drying gas after it has contacted said composition being dried; and

(5) each said conduit means accessing said tubular vessel at said opening thereby together forming a means to avoid excessive dilution of incoming gas by gas being removed from said vessel.

4,707,453

VESICLE INCLUDING A METAL MARKER FOR USE IN AN ASSAY

Daniel B. Wagner, Raleigh, N.C., and Robert A. Baffi, Devaulf, Pa., assignors to Becton Dickinson and Company, Franklin Lakes, N.J.

Filed Apr. 5, 1985, Ser. No. 720,397
Int. Cl.[4] G01N *33/533, 33/546*
U.S. Cl. 436—501 **28 Claims**

1. In an assay process for an analyte wherein a tracer is detected in the assay, the improvement comprising:

detecting in the assay a tracer, said tracer comprising a vesicle derivatized with a ligand, a portion of such vesicle wall being formed from an amphiphilic chelating agent having complexed therewith detectable metal atoms.

21. A reagent kit for use in an assay for an analyte, comprising:

a tracer comprising a vesicle derivatized with a ligand, a portion of said vesicle wall being formed from an amphiphilic chelating agent having complexed therewith detectable metal atoms.

4,707,454

FLUORESCENT CHLOROPHYLL LABELED ASSAY REAGENTS

John L. Hendrix, Marietta, Ga., assignor to Bio-Diagnostics, Inc., Arlington, Tex.

Continuation-in-part of Ser. No. 291,793, Aug. 10, 1981. This application Feb. 16, 1984, Ser. No. 580,875
Int. Cl.[4] G01N *33/533*
U.S. Cl. 436—546 **5 Claims**

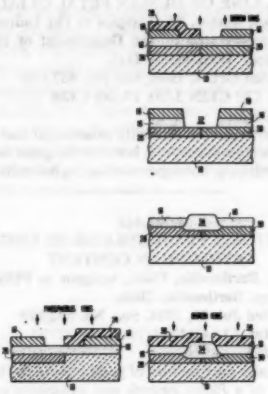
1. A fluorescent labeled reagent comprising an assay reagent conjugated with an isolated chlorophyll having a Stokes shift of not less than 150 nanometers, said assay reagent being selected from the group consisting of antibodies, antigens, hormones, virus particles, haptens, bacterial components, drugs, monoclonal antibodies, anti-antibodies, immunoglobulins and proteins.

4,707,455

METHOD OF FABRICATING A TWIN TUB CMOS DEVICE

Joseph C. Tsang, Raleigh, N.C.; Mario Ghezzo, Ballston Lake, N.Y., and Robert T. Fuller, Durham, N.C., assignors to General Electric Company

Filed Nov. 26, 1986, Ser. No. 935,372
Int. Cl.[4] H01L *21/425*
U.S. Cl. 437—57 **8 Claims**



1. A method of fabricating a semiconductor device on a semiconductor substrate having a wafer layer thereon containing a dopant, said method comprising the steps of:

forming an oxide layer on a major surface of said wafer layer;

forming on the exposed surface of said oxide layer a layer of nitride material having a window exposing said oxide layer;

forming a first mask layer at least over a first portion of said window;

introducing a first type of dopant through the regions of said oxide layer and said nitride layer which do not underlie said first mask layer to thereby form a first region of predetermined depth in said wafer layer;

removing said first mask layer;

forming a second mask layer at least over a second portion of said window substantially adjacent to said first portion of said window;

introducing a second type of dopant through the regions of said oxide layer and said nitride layer which do not underlie said second mask layer to thereby form a second region of predetermined depth in said wafer layer;

removing said second mask layer; and

exposing said wafer layer to a relatively elevated temperature to thereby simultaneously drive said first type of dopant and said second type of dopant deeper into said wafer layer;

whereby substantially adjacent wells of opposite dopant type are obtained in said semiconductor substrate.

4,707,456

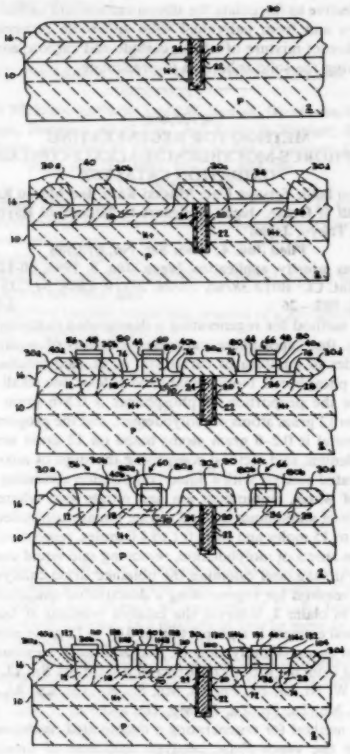
METHOD OF MAKING A PLANAR STRUCTURE CONTAINING MOS AND BIPOLAR TRANSISTORS

Mammen Thomas, San Jose, and Matthew Weinberg, Mountain View, both of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Sep. 18, 1985, Ser. No. 777,153

Int. Cl.[4] H01L *21/225, 21/76*

U.S. Cl. 437—59 **17 Claims**



17. A method of forming a highly planarized integrated circuit structure containing one or more bipolar devices and one or more MOS devices which comprises:

(a) forming a buried layer in at least a portion of a substrate parallel to at least a first surface thereon;

(b) forming an epitaxial layer on said substrate over said buried layer;

(c) forming an isolation zone in said substrate generally extending into said substrate from said first surface to a point below said buried layer;

(d) forming a first oxide layer on said first surface of said substrate;

(e) removing selective portions of said first oxide layer to form openings therein extending to said first surface of said substrate;

(f) growing a gate oxide layer over exposed portions of said substrate;

(g) selectively doping portions of said epitaxial layer to form portions of said devices in said substrate;

(h) depositing a first layer of polysilicon on said structure to fill said openings;

(i) doping said first polysilicon layer;

(j) planarizing said first polysilicon layer to a level at least equal to or slightly below portions of said first oxide layer adjacent said openings;

(k) masking said doped polysilicon to define collector, emitter, and gate contact portions;

(l) selectively removing polysilicon adjacent said masked emitter and gate contact portions to expose sidewall portions thereof;

(m) forming a second oxide layer over said structure including said exposed sidewalls of said emitter and gate contact portions;

(n) selectively removing said second oxide from said substrate while leaving portions of said second oxide layer adjacent said polysilicon sidewalls of said emitter and gate contact portions;

(o) forming a second polysilicon layer over said structure to fill said openings formed by said selective removal of portions of said second oxide layer;

(p) planarizing said second polysilicon layer;

(q) selectively doping said second polysilicon layer to form base, source, and drain contact portions therein; and

(r) forming base, emitter, source, and drain regions in said substrate beneath said contact portions.

4,707,457

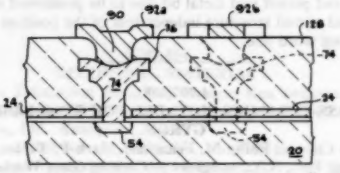
METHOD FOR MAKING IMPROVED CONTACT FOR INTEGRATED CIRCUIT STRUCTURE

Darrell M. Erb, Los Altos, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Apr. 3, 1986, Ser. No. 847,796

Int. Cl.[4] H01L *21/76*

U.S. Cl. 437—193 **7 Claims**



1. A method of making an integrated circuit structure comprising MOS devices connected to word lines and bit lines and having an improved contact construction therein comprising:

(a) providing an integrated circuit substrate;

(b) forming a first oxide layer over said substrate comprising a gate oxide portion and one or more field oxide portions.

(c) forming a first conductive polysilicon layer over said substrate and insulated therefrom by said first oxide layer comprising a word line in electrical communication with one or more gate electrodes over said gate oxide;

(d) forming a second oxide layer over said first conductive polysilicon layer;

(e) forming a self-aligned contact opening through said second oxide layer, said underlying first conductive polysilicon layer, and said first oxide layer by an anisotropic reactive ion etching process to control the lateral dimensions of said opening;

(f) forming a doped region in said substrate through said contact opening to form an active source/drain region for

an MOS transistor in said substrate, whereby said doped region in said substrate comprising said active source/-drain region will be self-aligned with said contact opening;

(g) forming a third layer of oxide material over said structure;

(h) reactive ion etching said third oxide layer to remove said layer except for oxide portions remaining on the sidewalls of said self-aligned contact opening to cover the exposed edges of said first conductive polysilicon layer and to expose at least a central portion of said doped source/-drain region in said substrate;

(i) depositing a second layer of polysilicon conductive material over said structure and in said self-aligned contact opening;

(j) doping said second polysilicon layer with dopant comprising the same conductivity type as used in said doping step to form said doped region in said substrate beneath said contact;

(k) diffusing dopant from said doped polysilicon second conductive layer into a portion of said doped source/drain region to form a good contact between said source/drain region in said substrate and said polysilicon material deposited in said opening;

(l) patterning said second polysilicon conductive layer to provide wing portions of said second polysilicon layer extending laterally of said self-aligned opening and over said first conductive polysilicon word line layer to facilitate subsequent electrical connection thereto through vias from one or more metal layers subsequently applied to said structure;

(m) forming a fourth oxide layer over said remaining wing portion of said second polysilicon conductive layer;

(n) forming a contact via through said fourth oxide layer to said winged polysilicon portion; and

(o) forming a metal bit line over said fourth oxide layer in electrical contact with said winged polysilicon portion;

whereby said contact from said source/drain regions of said MOS structure to said metal bit line may be made using self-alignment techniques which permit close spacing between said bit line contacts to said source/drain regions and said word line wherein said oxide sidewalls on said contact opening and said winged polysilicon contact portions prevent misalignment and possible shorting between said word line and said bit line contact and permit said metal bit line to be positioned on said integrated circuit structure independent of the position of the underlying word line.

4,707,458

GLASS-CERAMICS SUITABLE FOR RING LASER GYROS

Kenneth Chyung; Philip M. Fenn, and Mark P. Taylor, all of Painted Post, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Jun. 3, 1985, Ser. No. 740,762

Int. Cl.[4] C03C *10/14*

U.S. Cl. 501—4 **4 Claims**

1. A highly crystalline, virtually haze-free, glass-ceramic body exhibiting extremely high optical transparency, a coefficient of thermal expansion over the temperature range of $-50°$ to $+100°$ C. between -1 to $+1\times10^{-7}$/°C., long term thermal stability, and excellent resistance to permanent deformation during thermal cycling, and containing β-quartz solid solution crystals having diameters of less than about 500 Å as essentially the sole crystal phase, consisting essentially, expressed in terms of weight percent on the oxide basis, of:

SiO_2	64–67	ZnO	0.7–4.2
Al_2O_3	21–24	TiO_2	2.0–3.25
Li_2O	2.6–3.7	ZrO_2	1.25–2.5
MgO	0.8–1.5	$TiO_2 + ZrO_2$	4–5.25

4,707,459

REACTING-BONDED SILICON CARBIDE SPHEROIDS AND PROCESS OF MAKING

Peter Kennedy, Broughton, and John O. Ware, Lea, both of England, assignors to United Kingdom Atomic Energy Authority, London, England

Filed Nov. 6, 1984, Ser. No. 668,808

Claims priority, application United Kingdom, Dec. 19, 1983, 8333792

Int. Cl.[4] C04B *35/52*

U.S. Cl. 501—90 **11 Claims**

1. A method of producing silicon carbide-carbon spheroids, said method comprising

preparing a slip consisting essentially of an aqueous suspension of silicon carbide and carbon powders and a dispersant, said dispersant being present in an amount effective to prevent flocculation;

introducing drops of the slip into an aqueous solution of an electrolyte, said electrolyte being present in an amount effective to flocculate the silicon carbide and carbon powders and form individual solid spheroids comprising a coherent mixture of silicon carbide and carbon; and

allowing the solid spheroids to precipitate.

4,707,460

METHOD FOR REGENERATING PHOSPHORUS-MOLYBDENUM-ALKALI CONTAINING OXIDATION CATALYST

Kazuhiro Ishii; Tetsuya Uno; Masaki Kato, and Masao Kobayashi, all of Otake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Jun. 4, 1986, Ser. No. 870,588

Claims priority, application Japan, Jun. 5, 1985, 60-122061

Int. Cl.[4] B01J *38/66, 27/28, 27/19*; C07C *51/235*

U.S. Cl. 502—26 **3 Claims**

1. A method for regenerating a deactivated oxidation catalyst for the vapor-phase catalytic oxidation of unsaturated aldehydes to unsaturated carboxylic acids, said catalyst containing phosphorus, molybdenum and at least one alkali metal, wherein the proportion of phosphorus is 0.5–6 gram atoms based on 12 gram atoms of molybdenum, and the proportion of alkali metal is 0.2–6 gram atoms based on 12 gram atoms of molybdenum, said method comprising the steps of mixing the deactivated catalyst with a liquid composition consisting essentially of water, ammonium ion and nitrate ion, wherein the contents of ammonium ion and nitrate ion are controlled to be from 7 to 15 moles and from 0.1 to 4.0 moles, respectively, per 12 gram atoms of molybdenum, removing said liquid composition by drying, and calcining the obtained dried catalyst.

2. A method for regenerating a deactivated oxidation catalyst as in claim 1, wherein the catalyst contains at least one additional element in a proportion of 0.01 to 12 gram atoms per 12 gram atoms of molybdenum, said additional element being selected from the group consisting of As, Cd, In, Sn, Tl, Ca, V, U, Ce, W, Ni, Zr, Ba, Fe, Rh, Mn, Re, Ru, Co, Cu, Al, Si, Cr, Ge, Ti, Nb, Ta, Pb, Zn, Sr, Mg, Ga, and Pd.

3. A method for regenerating a deactivated oxidation catalyst for the vapor-phase catalytic oxidation of unsaturated aldehydes to unsaturated carboxylic acids, said catalyst containing phosphorus, molybdenum and at least one alkali metal, wherein the proportion of phosphorus is 0.5–6 gram atoms based on 12 gram atoms of molybdenum, and the proportion of alkali metal is 0.2–6 gram atoms based on 12 gram atoms of molybdenum, said method comprising the steps of mixing a mixture consisting essentially of the deactivated catalyst and salts and/or oxides of elements in which the deactivated catalyst is deficient with a liquid composition consisting essentially of water, ammonium ion and nitrate ion, wherein the contents of ammonium ion and nitrate ion are controlled to be from 7 to 15 moles and from 0.1 to 4.0 moles, respectively, per 12 gram atoms of molybdenum, removing said liquid composition by drying, and calcining the obtained dried catalyst.

4,707,461
VANADIUM PASSIVATION IN A HYDROCARBON CATALYTIC CRACKING PROCESS

Bruce R. Mitchell, Cross Keys Village, Md., and Roger F. Vogel, Jefferson Township, Butler County, Pa., assignors to Chevron Research Company, San Francisco, Calif.

Continuation of Ser. No. 608,019, May 7, 1984, abandoned, which is a continuation-in-part of Ser. No. 536,754, Sep. 28, 1983, Pat. No. 4,451,355. This application Oct. 30, 1985, Ser. No. 792,725

Int. Cl.[4] B01J *29/06*

U.S. Cl. 502—64 **2 Claims**

1. A catalyst composition comprising a crystalline aluminosilicate zeolite, a matrix material, and from 5 to 40 weight percent, based on the total catalyst, of a calcium-containing, substantially water-insoluble, additive which will not neutralize the acidic sites of the catalyst, said additive comprising substantially amorphous calcium silicate, said calcium-containing additive being a separate and discrete component of said catalyst composition.

4,707,462
ORGANOMAGNESIUM SOLUTIONS OF LOW VISCOSITY

Dennis B. Malpass, LaPorte; Loyd W. Fannin, Dickinson; Clark C. Crapo, Houston, all of Tex., and Kelly B. Triplett, Stamford, Conn., assignors to Texas Alkyls, Inc., Westport, Conn.

Filed Apr. 24, 1986, Ser. No. 855,290

Int. Cl.[4] B01J *31/12*

U.S. Cl. 502—153 **12 Claims**

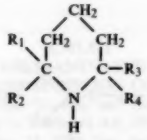
1. A hydrocarbon solution of a dialkylmagnesium compound having reduced viscosity, which solution comprises:

(a) a hydrocarbon solvent;

(b) a dialkylmagnesium compound normally soluble in hydrocarbon solvents; and

(c) an effective viscosity-reducing amount of a nitrogen-containing compound which is;

(i) cyclohexylamine; dicyclohexylamine; or a piperidine having the formula



in which R_1–R_4 are independently hydrogen or a hydrocarbyl group selected from C_1–C_4 alkyl, C_5–C_6 cycloalkyl, and phenyl, at least one of R_1–R_4 being a hydrocarbyl group; or a mixture of two or more of said nitrogen-containing compounds;

(ii) a substance produced by reacting such nitrogen-containing compound with magnesium or with a dialkylmagnesium compound; or

(iii) a mixture of (i) or (ii) with an organoaluminum viscosity-reducing agent.

4,707,463
HEAT SENSITIVE RECORDING MATERIAL

Haruhiko Ikeda, and Shigetoshi Hiraishi, both of Tokyo, Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

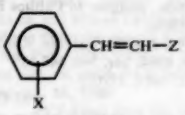
Filed Aug. 28, 1986, Ser. No. 901,263

Claims priority, application Japan, Aug. 28, 1985, 60-190224; Sep. 2, 1985, 60-194565; Dec. 26, 1985, 60-295600; Dec. 28, 1985, 60-297936

Int. Cl.[4] B41M *5/18*

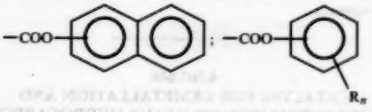
U.S. Cl. 503—209 **10 Claims**

1. A heat-sensitive recording material comprising a colorless or light-colored dye precursor and a color developer capable of developing a color of said dye precursor upon reaction with said dye precursor with heating, said heat-sensitive recording material further containing a compound represented by general formula:



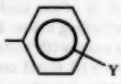
(I)

wherein X represents a member selected from the group consisting of a hydrogen atom, a halogen atom, a lower alkyl group and a lower alkoxy group; Z represents a member selected from the group consisting of:



wherein R represents an alkyl group, a halogen atom, an alkoxy group, an acyloxy group or an acyl group and n represents 0 or an integer of 1 or 2;

wherein R′ represents a substituted or unsubstituted aryl group, or a substituted or unsubstituted aralkyl group; and,



wherein Y represents a hydrogen atom, a halogen atom, a lower alkyl group or a lower alkoxy group.

4,707,464
RECORDING MATERIAL

Masanobu Takashima; Masato Satomura; Ken Iwakura, and Akira Igarashi, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

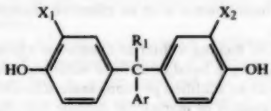
Filed Nov. 21, 1986, Ser. No. 933,514

Claims priority, application Japan, Nov. 22, 1985, 60-263228; Nov. 22, 1985, 60-263229; Dec. 20, 1985, 60-287068

Int. Cl.[4] B41M *5/16, 5/18, 5/22*

U.S. Cl. 503—216 **4 Claims**

1. A recording material comprising: one or more support(s), an electron donating leuco dye and one or more electron accepting compound(s), wherein said electron accepting compound(s) is/are represented by formula (I):



(I)

wherein R_1 represents a hydrogen atom, an alkyl group or an aryl group; Ar represents a substituted or unsubstituted polycyclic aryl group; and X_1 and X_2, which may be the same or different, each represents a hydrogen atom, a lower alkyl group, a lower alkenyl group or a halogen atom.

4,707,465

OLEFIN DISPROPORTIONATION AND CATALYST THEREFOR

Simon G. Kukes, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 195,699, Oct. 9, 1980, Pat. No. 4,487,986.
This application Aug. 29, 1984, Ser. No. 645,385
Int. Cl.[4] B01J 27/047, 27/051
U.S. Cl. 502—219 13 Claims

1. A composition suitable for the disproportionation of olefins comprising the product produced by admixing an inorganic refractory oxide containing a catalytic amount of at least one metal oxide selected from molybdenum oxide or tungsten oxide with a promoting amount of a dithionite salt of the formula $Me_xS_2O_4$ wherein Me is a metal selected from Groups IA and IIB and x is an integer sufficient to satisfy the valence requirements.

4,707,466

CATALYST FOR DEMETALLATION AND DESULFURIZATION OF HEAVY HYDROCARBONS

William I. Beaton, Wheaton, Ill.; Albert L. Hensley, Munster, Ind., and April J. Evans, Naperville, Ill., assignors to Amoco Corporation, Chicago, Ill.

Division of Ser. No. 811,724, Dec. 20, 1985, Pat. No. 4,657,665.
This application Feb. 24, 1987, Ser. No. 17,828
Int. Cl.[4] B01J 23/88
U.S. Cl. 502—313 3 Claims

1. A catalyst for the hydrodemetallkation, hydrodesulfurization, and hydrocracking of a hydrocarbon feedstock containing asphaltenes, metals, and Shell hot filtration solids precursors and the conversion of at least 30 vol. % of the feedstock fraction boiling over 1,000° F. to material boiling below 1,000° F. in at least one ebullated bed reaction zone with hydrogen wherein said catalyst comprises a Group VIB metal component and a cobalt component on a porous inorganic oxide support, wherein said Group VIB metal is present in an amount ranging from about 3.5 to about 5.0 wt. % calculated as an oxide and based on total catalyst weight, wherein said cobalt is present in an amount ranging from about 0.4 to about 0.8 wt. % calculated as an oxide and based on total catalyst weight, and wherein said catalyst has a surface area of about 150 to about 220 m^2/gm, a total pore volume of about 0.85 to about 1.5 cc/gm, and a pore volume in pores having diameters larger than 1,200 angstroms of about 0.15 to about 0.4 cc/gm.

4,707,467

GAS FILTER

Ladislav Benisek, Burley-in-Wharfedale, and Gerald K. Edmondson, Bradford, both of England, assignors to Wool Development International Limited, Ilkley, England

Filed May 27, 1986, Ser. No. 867,808
Claims priority, application United Kingdom, May 28, 1985, 8513386
Int. Cl.[4] B01J 20/24, 20/06, 31/32; F01N 3/15
U.S. Cl. 502—403 12 Claims

1. A filter for noxious gases which comprises a keratinous fiber substrate impregnated with an effective amount of manganese dioxide.

9. A method of making a filter as claimed in claim 1 which comprises providing a keratinous fibre substrate and treating the substrate with an acidified permanganate solution whereby to effect impregnation of manganese dioxide into the fibres.

12. A filter assembly for gases such as sulphur dioxide, nitrogen dioxide, ozone, formaldehyde, hydrogen sulphide, and volatile lead products from car exhausts, which comprises a housing containing a bat of keratinous fibres into which is impregnated an effective amount of manganese dioxide, the fibres being maintained in a wet state during use.

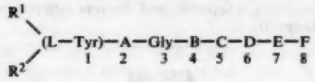
4,707,468

POLYPEPTIDE

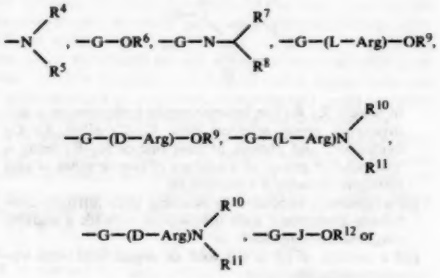
Hiroshi Yoshino, Abiko; Yutaka Tsuchiya, Ushikumachi; Takeru Kaneko, Yatabe; Takahiro Nakazawa, Fujishiro, all of Japan; Masuhiro Ikeda, Miami Springs, Fla.; Shin Araki, Yatabemachi, Japan; Kiyomi Yamatsu, Kamakura, Japan; Shinro Tachibana, Kashiwa, Japan, and Yoshihiro Arakawa, Ibaraki, Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

Filed Nov. 8, 1985, Ser. No. 796,390
Claims priority, application Japan, Nov. 9, 1984, 59-236076
Int. Cl.[4] H61K 37/02; C07K 7/12, 7/06
U.S. Cl. 514—16 29 Claims

1. A polypeptide having the formula:



wherein R^1 and R^2 can be the same or different and each is hydrogen, lower alkyl or lower alkenyl; A is selected from the group consisting of D-Met, D-Ala, D-Ser, D-Cys, D-Thr, Gly and Sar, provided that when A is D-Cys, it is bonded with L-Cys or D-Cys located in position 5 through a S—S bond to effect intramolecular ring closure; B is L-Phe or D-Phe in which the benzene ring can be substituted or an α-N-alkyl derivative thereof; C is selected from the group consisting of L-Leu, L-Ile, L-Nle, L-tert.-Leu, L-Met, L-Met(O), L-Ser, L-Cys, L-Val, D-Cys and α -N-alkyl derivatives thereof, provided that when A is D-Cys, C is L-Cys or D-Cys and C is bonded with A through said S—S bond; D and E each is selected from the group consisting of L-Arg, D-Arg, L-Lys, D-Lys, L-homo-Arg, D-homo-Arg, L-Orn, D-Orn and α-N-alkyl derivatives thereof; F is OR^3,



in which R^3, R^4, R^5, R^6, R^7, R^8, R^9, R^{10}, R^{11}, R^{12}, and R^{13} are the same or different and each is hydrogen or lower alkyl, G is selected from the group consisting of Gly, Ala, Val, Leu, Ile, Ser, Thr, Cys, Met, Asp, Glu, Asn, Gln, Pro, Lys, Orn, Arg, His, Phe, Tyr, Trp, tert.-Leu, 2-aminoisobutyric acid, α-methyl-Leu, β-alanine, γ-aminobutyric acid and α-N-alkyl derivatives thereof, J is selected from the group consisting of Gly, Sar, L-Ala, D-Ala, L-Phe, D-Phe, L-Asp and D-Asp, and M is selected from the group consisting of D-Pro, D-ala and D-Glu, provided that at least one of A, B, C, D, E and F comprises a D-amino acid or an N-alkyl derivative of a D-amino acid or a L-amino acid, or a pharmacologically acceptable salt of said polypeptide.

4,707,469
GANGLIOSIDES MIXTURE, USEFUL AS A THERAPEUTICAL TOOL FOR ELIMINATING PAINFUL EFFECTS OR PERIPHERAL NEUROPATHIES

Francesco della Valle, Padua; Aurelio Romeo, Rome, and Silvana Lorenzi, Padua, all of Italy, assignors to Fidia, S.p.A., Abano Terme, Italy

Filed Jun. 13, 1985, Ser. No. 744,338
Claims priority, application Italy, Jun. 27, 1984, 48491 A/84
Int. Cl.[4] A61K *31/70*
U.S. Cl. 514—26 10 Claims

1. A method for treating pain comprising administering to a host in pain a composition comprising an effective pain relieving amount of at least one ganglioside selected from the group consisting of GM_1, GD_{1a}, GD_{1b} and GT_{1b}.

4,707,470
POLYENE ANTIBIOTIC EMULSION FORMULATION

Richard L. Kirsh, Wayne, and Louis J. Ravin, Plymouth Meeting, both of Pa., assignors to Smithkline Beckman Corporation, Philadelphia, Pa.

Filed May 17, 1985, Ser. No. 735,492
Int. Cl.[4] A61K *47/00, 31/17, 31/18, 31/57*
U.S. Cl. 514—31 29 Claims

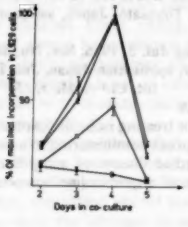
1. A pharmaceutical formulation suitable for admixture to a parenterally administerable oil-in-water emulsion, comprising amphotericin B and dimethylacetamide in an amount sufficient to incorporate the amphotericin B into the oil-in-water emulsion upon admixture.

3. A polyene antibiotic emulsion formulation which comprises a therapeutically effective amount of a polyene antibiotic incorporated into an oil-in-water emulsion suitable for parenteral administration.

4,707,471
WATER-SOLUBLE AMINATED β-1,3-BOUND D-GLUCAN AND COMPOSITION CONTAINING SAME

Olle Larm, Stockholm, Sweden, and Rolf Seljelid, Tromsö, Norway, assignors to Medicarb AB, Stockholm, Sweden

Filed Dec. 11, 1984, Ser. No. 680,509
Claims priority, application Sweden, Dec. 19, 1983, 8307026
Int. Cl.[4] C07H *15/04;* C08B *37/00;* A61K *31/70, 31/73*
U.S. Cl. 514—54 19 Claims



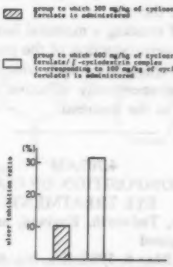
1. A water-soluble aminated β-1,3-bound D-glucan wherein the glucan is selected from the group consisting of laminaran, curdlan, pachyman, yeast glucan and lichenan.

12. A method for activating mononuclear phagocytes in vertebral animals comprising administering to an animal in need of such treatment a sufficient amount of a water-soluble aminated β-1,3-bound D-glucan to activate mononuclear phagocytes.

4,707,472
CYCLOARTENOL FERULATE/CYCLODEXTRIN COMPLEX

Tetsuya Inagaki; Hidemi Aoki; Hiroyasu Aikawa, all of Saitama, and Masao Takahashi, Tokyo, all of Japan, assignors to Zeria Shinyaku Kogyo Kabushiki Kaisha, Tokyo, Japan

PCT No. PCT/JP85/00367, § 371 Date Feb. 28, 1986, § 102(e) Date Feb. 28, 1986, PCT Pub. No. WO86/00312, PCT Pub. Date Jan. 16, 1986
PCT Filed Jun. 29, 1985, Ser. No. 845,134
Claims priority, application Japan, Jun. 30, 1984, 59-136795
Int. Cl.[4] A61K *31/73*
U.S. Cl. 514—58 5 Claims


group to which 300 mg/kg of cycloartenol ferulate is administered
group to which 600 mg/kg of cycloartenol ferulate/β-cyclodextrin complex (corresponding to 300 mg/kg of cycloartenol ferulate) is administered
ulcer inhibition ratio (%)
30
20
10

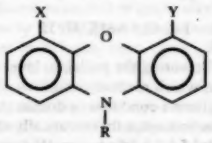
1. A composition for improving the bioavailability of cycloartenol ferulate comprising a complex of cycloartenol ferulate and cyclodextrin in a weight ratio of 1:3.

4,707,473
4-MONOSUBSTITUTED AND 4,6-DISUBSTITUTED PHENOXAZINES

Joseph M. Muchowski, Sunnyvale; Robert J. Greenhouse, Cupertino, both of Calif., and Angel Guzman, Mexico City, Mexico, assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed May 30, 1986, Ser. No. 868,976
Int. Cl.[4] A61K *31/695;* C07F *7/10*
U.S. Cl. 514—63 42 Claims

1. A compound represented by the formula:



where:

R is a sterically hindered silyl protecting group;

X is alkyl, hydroxyalkyl, alkylthio, haloalkyl, $C(O)R^1$, $CH_2NR^2R^3$, or $Si(R^4)_2R^5$; where:

R^1 is hydrogen, hydroxy, alkyl, alkoxy, aryl, aryloxy, or amino;

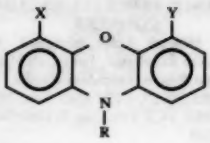
R^2 and R^3 are independently hydrogen or alkyl, or NR^2R^3 together represent a heterocyclic ring having from four to seven members and containing no more than one hetero-atom additional to the nitrogen of NR^2R^3;

R^4 is lower alkyl or phenyl; and

R^5 is lower alkyl;

Y is the same as X or hydrogen; or a pharmaceutically acceptable salt thereof.

34. A compound represented by the formula:



where:

R is a protecting group or hydrogen;

X is $Si(R^4)_2R^5$, where R^4 is lower alkyl or phenyl, and R^5 is lower alkyl;

Y is the same as X or hydrogen; or a pharmaceutically acceptable salt thereof.

37. A method of treating a mammal having a disease state characterized by overproduction of the products of lipoxygenase metabolism of arachidonic acid, which method comprises administering a therapeutically effective amount of a compound of claim **34** to the mammal.

4,707,474

VETERINARY COMPOSITION OF CLOXACILLIN FOR EYE TREATMENT

Robert J. Bywater, Tadworth, England, assignor to Beecham Group p.l.c., England

Filed May 6, 1983, Ser. No. 492,472

Claims priority, application United Kingdom, May 12, 1982, 8213703

Int. Cl.[4] A61K *31/43*

U.S. Cl. 514—196 **21 Claims**

1. A method for treating infectious keratoconjunctivitis of animals comprising administering an effective, non-toxic amount of a formulation comprising an effective amount of a veterinarily acceptable cloxacillin salt and a veterinarily acceptable oil, by instillation into an infected eye of the animal.

4,707,475

AGENT FOR LOWERING SERUM PROLACTIN LEVELS

Victor Brantl, Wiesbaden; Werner Bomann, Ingelheim am Rhein, and Herbert Schill, Appenheim, all of Fed. Rep. of Germany, assignors to Boehringer Ingelheim KG, Ingelheim am Rhein, Fed. Rep. of Germany

Filed Jan. 23, 1986, Ser. No. 821,924

Claims priority, application Fed. Rep. of Germany, Jan. 25, 1985, 3502365

Int. Cl.[4] A61K *31/55*

U.S. Cl. 514—215 **7 Claims**

1. A method of lowering the prolactin level in the blood or serum of a person, which method comprises administering, to a person suffering from a condition or disease state treatable by reducing the prolactin level, a therapeutically effective amount of 2-amino-6-allyl-5,6,7,8-tetrahydro-4H-thiazolo-[5,4-d]azepine or a non-toxic, pharmaceutically acceptable acid addition salt thereof.

4,707,476

TREATING STATES OF AGITATION WITH AZATETRACYCLIC COMPOUNDS

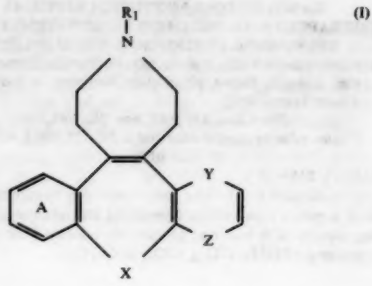
Hans Blattner, Riehen, and Angelo Storni, Rheinfelden, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 961,324, Nov. 17, 1978, abandoned, which is a continuation-in-part of Ser. No. 798,204, May 18, 1977, abandoned. This application Sep. 29, 1980, Ser. No. 191,728

Int. Cl.[4] A61K *31/55*; C07D *487/04*

U.S. Cl. 514—215 **15 Claims**

1. An azatetracyclic compound of the formula



(I)

wherein

R_1 represents hydrogen, lower alkyl, cycloalkyl-lower alkyl of not more than 10 carbon atoms, lower alkenyl, lower alkynyl, (di-lower alkylamino)-lower alkyl, hydroxy lower alkyl, alkoxy lower alkyl, alkanoyloxy lower alkyl having 4 to 11 carbon atoms, lower alkylthio-lower alkyl, phenyl-lower alkyl, phenyl-lower alkyl substituted by halogen with an atomic number up to 35, lower alkyl, lower alkoxy, methylenedioxy, and trifluoromethyl, or lower alkanoyl, the ring A is unsubstituted or substituted by halogen with an atomic number up to 35, lower alkyl, hydroxyl, lower alkoxy, alkanoyloxy having 1–3 carbon atoms, lower alkylthio, trifluoromethyl or cyano,

X represents O, S, methylene, a direct bond or a divalent radical of the partial formula

(Ia)

in which R_3 represents hydrogen or lower alkyl, and one of the radicals Y and Z represents vinylene or S and the other represents a direct bond, and the acid addition salts thereof.

13. A method of treating states of agitation in a warmblooded animal which comprises administering to said animal a therapeutically effective amount of a compound according to claim **1**, or a pharmaceutically acceptable acid addition salt thereof.

4,707,477

TREATING AND PREVENTING AGENT FOR ISCHEMIC CARDIAC DISEASE AND ARRHYTHMIA

Toshiji Igarashi, Toyosato, Japan, assignor to Eisai Co., Ltd., Tokyo, Japan

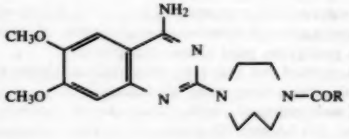
Filed Jul. 3, 1986, Ser. No. 881,868

Claims priority, application Japan, Jul. 16, 1985, 60-155096

Int. Cl.[4] A61K *31/55*

U.S. Cl. 514—218 **3 Claims**

1. A method for treating ischemic cardiac disease or arrhythmia, which comprises administering to a patient suffering from the ischemic cardiac disease or arrhythmia a therapeutically effective amount of a quinazoline compound having the formula



in which R is lower alkyl, phenyl, phenyl substituted with methoxy, halogen or methanesulfonyl, furyl, styryl or styryl substituted with halogen, methoxy or methylenedioxy, or a pharmaceutically acceptable salt thereof.

4,707,478

HETEROCYCLIC AMIDINO SUBSTITUTED UREAS AND THEIR PHARMACEUTICAL USES

William L. Studt, Harleysville; Harry K. Zimmerman, Quakertown, and Stuart A. Dodson, Lansdale, all of Pa., assignors to Rorer Pharmaceutical Corporation, Fort Washington, Pa.

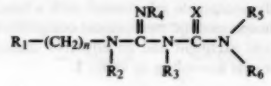
PCT No. PCT/US81/01146, § 371 Date Sep. 16, 1982, § 102(e) Date Sep. 16, 1982, PCT Pub. No. WO83/00627, PCT Pub. Date Mar. 3, 1983

PCT Filed Aug. 24, 1981, Ser. No. 425,095

Int. Cl.⁴ A61K *31/17, 31/55, 31/47, 31/44*

U.S. Cl. 514—580 **4 Claims**

1. A method for the treatment of protozoal infections in afflicted humans or animals which comprises administering thereto an effective amount of a compound of the formula



wherein:

X is O or S;

n is 0 to 3;

R_1 is a 5, 6 or 7 atom ring including 1 to 3 hetero atoms of N, O or S, or 2-purine, 6-purine, 8-purine, 9-purine, 2-quinoline, 3-quinoline, 4-quinoline, 5-quinoline, 6-quinoline, 7-quinoline, 8-quinoline, 1-isoquinoline, 3-isoquinoline, 4-isoquinoline, 5-isoquinoline, 6-isoquinoline, 7-isoquinoline, 8-isoquinoline, or carbazole, which may be substituted by lower alkyl, lower alkenyl, phenyl, substituted phenyl, lower alkynyl, phenyl lower alkyl, substituted phenyl lower alkyl, halo, nitro, cyano, sulfonyl, hydroxyl, carboxyl, lower alkanoyl, lower alkoxy, phenyl lower alkoxy, substituted phenyl lower alkoxy, halo lower alkoxy, amido, amino, lower alkylacyloxy, alkylamino, lower alkoxyamino, phenylalkoxyamino or substituted phenylalkoxyamino; or the N- or S-oxides thereof; provided R_1 is not pyridyl when n is 0;

R_2, R_3 and R_4 are hydrogen or lower alkyl;

R_5 and R_6 are hydrogen, lower alkyl, cycloloweralkyl, lower alkenyl, lower alkoxy, phenyl, substituted phenyl, phenyl lower alkyl, substituted phenyl lower alkyl or R_5 and R_6 together with the nitrogen to which they are attached form a 3 to 7 atom ring which includes 0 to 2 additional hetero atoms of N, O or S;

wherein substituted phenyl means a phenyl group substituted by halo, lower alkyl, halo loweralkyl, nitro, amino, loweralkanoylamino, hydroxyl, loweralkoxy, phenylloweralkoxy, loweralkylacyloxy, cyano, halo loweralkoxy or loweralkyl sulfonyl;

or a pharmaceutically acceptable salt thereof.

4,707,479

CIRCULATION ACTIVE DIHYDROPYRIDINE-3-CARBOXAMIDES

Horst Meyer; Gerhard Franckowiak; Ulrich Rosentreter; Rainer Gross; Günter Thomas, all of Wuppertal; Matthias Schramm, Cologne; Michael Kayser, Hagen; Friedel Seuter, Wuppertal; Elisabeth Perzborn, Wuppertal, and Martin Bechem, Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

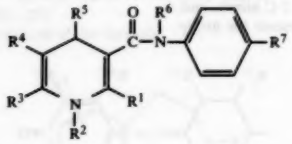
Filed Dec. 5, 1985, Ser. No. 806,057

Claims priority, application Fed. Rep. of Germany, Dec. 15, 1984, 3445852

Int. Cl.⁴ A61K *31/50;* **C07D** *401/12, 401/06, 401/14*

U.S. Cl. 514—222 **5 Claims**

1. A 1,4-dihydropyridinecarboxamide of the formula



in which

R^1 and R^3 are identical or different and represent cyano or linear or branched alkyl which has up to 6 C atoms and which is optionally substituted by halogen, aryl, pyridyl, furyl, thienyl, carboxyl, alkoxy, alkoxycarbonyl, acyloxy or hydroxyl,

R^2 represents hydrogen or linear or branched alkyl having up to 6 C atoms,

R^4 represents hydrogen, nitro, cyano or the radical COR^8, CO_2R^8, SO_2R^8 or

wherein

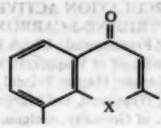
R^8 represents linear, branched or cyclic alkyl or alkenyl each of which has up to 10 C atoms and which can optionally be substituted by halogen, nitro, cyano, alkoxy, alkylthio, alkoxy-carbonyl, carboxyl, trifluoromethyl, trifluoromethoxy, aryl which is optionally substituted by C_1–C_6-alkoxy, or pyridyl, furyl, thienyl or by an amino group, the amino group optionally carrying hydrogen or a substituent or two identical or different substituents from the group consisting of alkyl and aralkyl, or these substituents optionally forming, together with the nitrogen atom, a 5-membered to 6-membered ring which can contain an oxygen, sulphur or nitrogen atom as a further hetero-atom and which can be substituted by C_1–C_6-alkyl,

or wherein

R^8 represents a direct bond to the alkyl in R^3 (in the event that R^3 is not cyano),

R^5 represents C_6–C_{14}-aryl which can optionally carry 1–5 identical or different substituents, selected from the group consisting of alkyl, halogen, cyano, nitro, trifluoromethyl, carboxamido, sulphonamido, —SO_2-alkyl, carboxyl, alkoxycarbonyl, alkoxy and alkylthio, it being possible for alkoxy and alkylthio in turn to be substituted by halogen or aryl, or

R^5 represents the radical



wherein

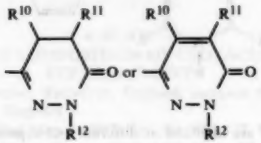
X denotes oxygen or sulphur and

R^9 denotes hydrogen, C_6–C_{10} aryl or C_1–C_6 alkyl, or

R^5 represents thienyl, furyl, pyrolyl, pyrazolyl, imidazolyl, oxazolyl, thiazolyl, pyridyl, pyridazinyl, pyrimidyl, pyrazinyl, benzimidazolyl, benzoxazolyl, benzoxadiazolyl, quinolyl or isoquinolyl or represents linear or branched C_1–C_8-alkyl which is optionally substituted by furyl, thienyl or pyridyl, or represents C_4–C_7-cycloalkyl,

R^6 represents hydrogen or linear or branched alkyl having up to 7 C atoms, and

R^7 represents the group



wherein

R^{10} and R^{11} can be identical or different and represent hydrogen or linear or branched alkyl having up to 8 C atoms, or R^{10} and R^{11} together with the carbon atoms to which they are attached form a 3-membered to 7-membered carboyclic ring,

R^{12} has the same meaning as R^6 and R^6 and R^{12} can be identical or different.

5. A method of controlling cardiac insufficiency, thrombosis, thromboembolism or ischaemia or for influencing the blood sugar level or the circulation or coronary activity or arrhythmia in a patient afflicted therewith which comprises administering to such patient an amount effective therefor of a compound or salt according to claim 1.

4,707,480

METHOD FOR STABILIZING A DETRUSOR MUSCLE WHILE INCREASING DETRUSOR MUSCLE STRENGTH

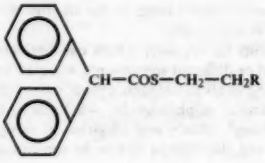
William M. Davis, Tucson, Ariz., assignor to United Pharmaceuticals, Inc., Tucson, Ariz.

Continuation of Ser. No. 485,056, Apr. 14, 1983, abandoned. This application Oct. 3, 1985, Ser. No. 783,311

Int. Cl.[4] A61K *31/21, 31/535, 31/445*

U.S. Cl. 514—228 **6 Claims**

1. A method for simultaneously inhibiting detrusor muscle contraction during bladder filling and increasing the force of voluntary contraction of the detrusor muscle during bladder emptying comprising administering to a patient requiring such treatment an effective amount of a di-N-substituted aminoethyl ester of diphenylthioacetic acid having the formula:



in which R represents a disubstituted amino radical of the group consisting of the diethylamino group, the morpholino group and the piperidino group.

4,707,481

PYRIDAZINONES, THEIR PREPARATION AND USE, AND BRONCHOSPASMOLYTIC MEDICAMENTS CONTAINING PYRIDAZINONES

Hermann Amschler, Radolfzell, and Wolf-Rüdiger Ulrich, Constance, both of Fed. Rep. of Germany, assignors to BYK Gulden Lomberg Chemische Fabrik GmbH, Constance, Fed. Rep. of Germany

PCT No. PCT/EP84/00139, § 371 Date Jan. 4, 1985, § 102(e) Date Jan. 4, 1985, PCT Pub. No. WO84/04521, PCT Pub. Date Nov. 22, 1984

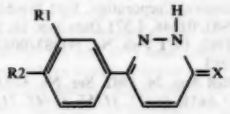
PCT Filed May 10, 1984, Ser. No. 690,655

Claims priority, application Switzerland, May 11, 1983, 2581/83

Int. Cl.[4] A61K *31/50;* **C07D** *237/14*

U.S. Cl. 514—247 **13 Claims**

1. A 6-aryl-3[2H]pyridazinones of formula I



(I)

wherein one of the substituents R1 or R2 denotes a methoxy group and the other denotes an alkoxy group with 2 to 5 carbon atoms or an alkenyloxy group with 3 to 5 carbon atoms, and X denotes an oxygen atom or a sulfur atom, or a pharmacologically-acceptable salt thereof with a base.

7. A brochospasmolytic medicament composition containing pharmaceutical excipient and an effective amount of one or more compounds according to claim 1.

4,707,482

4-(2,1,3-BENZOXADIAZOL AND BENZOTHIADIAZOL-4-4L)-1,4-DIHYDROPYRIDINE-3,5-DICARBOXYLIC ACID ESTERS USEFUL AS ANTIHYPERTENSIVES

Arnold Vogel, Riehen, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

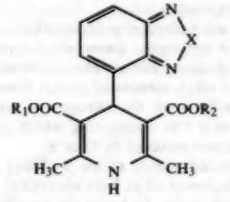
Filed Dec. 4, 1985, Ser. No. 804,633

Claims priority, application Fed. Rep. of Germany, Dec. 10, 1984, 3444965

Int. Cl.[4] A61K *31/495;* **C07D** *413/14, 413/04, 417/14*

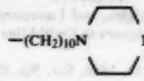
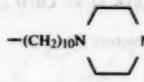
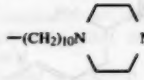
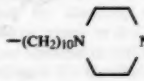
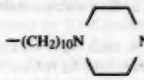
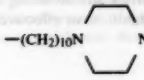
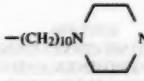
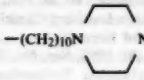
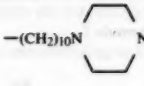
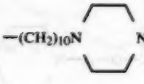
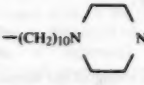
U.S. Cl. 514—253 **9 Claims**

1. A compound of formula I:



I

wherein X, R_1 and R_2 have the significances indicated below and the configuration at the carbon atom in the 4 position of the 1,4-dihydropyridinyl moiety is as indicated hereafter:

Compound No.	X	R_1	R_2	Configuration	
1	O	Me		(S)	(+)
2	O	Me		(R)	(−)
3	O	Me		(R,S)	
4	O	Me		(S)	(+)
5	O	Me		(R)	(−)
6	O	Me		(R,S)	
7	O	Me		(S)	(+)
8	O	Me		(R)	(−)
9	O	Me		(R,S)	
10	S	Me		(R,S)	
11	O	iPr		(R,S)	

in free base or, where appropriate, in pharmaceutically acceptable acid addition salt form.

4. A pharmaceutical composition useful in treating coronary insufficiency, disturbances in circulation, asthma, hypertension or migraine and vascular headaches comprising a pharmaceutically acceptable carrier or diluent and a therapeutically effective amount of a compound of claim **1**, in free form or in pharmaceutically acceptable acid addition salt form.

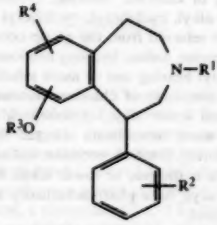
4,707,483

1-PHENYL-3-BENZAZEPINES AND THEIR USE FOR TREATING GASTROINTESTINAL MOTILITY DISORDERS

William E. Bondinell, Wayne; Thomas Wen-Fu Ku, Dresher, and Herbert S. Ormsbee, III, Wayne, all of Pa., assignors to SmithKline Beckman Corporation, Philadelphia, Pa.

Filed Dec. 20, 1985, Ser. No. 811,790
Int. Cl.[4] A61K *31/55;* **C07D** *223/16*
U.S. Cl. 514—273 **10 Claims**

1. A compound of the formula:



in which:

R^1 is hydrogen, lower alkyl or C_3–C_5alkenyl;

R^2 is hydrogen, hydroxy, lower alkoxy, halogen, trifluoromethyl, lower alkyl, SO_nlower alkyl, SO_nCF_3, SO_nphenyl or $SO_2NR^6R^7$;

R^3 is hydrogen, lower alkyl or lower alkanoyl;

R^4 is SO_nR^5 or $SO_2NR^6R^7$;

n is 0, 1 or 2;

R^5 is

or trifluoromethyl; and

R^6 and R^7 are hydrogen or lower alkyl or a pharmaceutically acceptable acid addition salt thereof.

9. A method of treating gastrointestinal motility disorders which comprises administering internally to a subject in need of said treatment an effective amount of a compound of claim **1**.

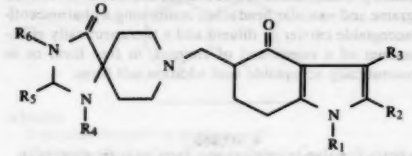
4,707,484

SUBSTITUTED PIPERIDINOMETHYLINDOLONE AND CYCLOPENT(B)INDOLONE DERIVATIVES

Leo Berger, Montclair; Wallace M. Dairman, Manahawkin; Thomas F. Mowles, Pine Brook, and Gary L. Olson, Westfield, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

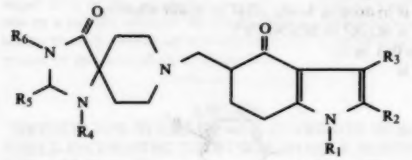
Filed Nov. 25, 1986, Ser. No. 934,756
Int. Cl.[4] A61K *31/395;* **C07D** *521/00*
U.S. Cl. 514—278 **12 Claims**

1. A compound of the formula



wherein R_1 is hydrogen, lower alkyl or acyl; R_2 and R_3 independently are lower alkyl, alkyl substituted by phenyl, or alkyl substituted by phenyl bearing one or more substituents selected from the group consisting of halogen, trifluoromethyl, lower alkyl, lower alkoxy, nitro, amino, lower alkylamino and dilower alkylamino or a straight or branched chain unsaturated hydrocarbon containing 2 to 7 carbon atoms or R_2 and R_3 together are trimethylene or tetramethylene; R_4 is phenyl; phenyl bearing one or more substituents selected from the group consisting of chlorine, fluorine, bromine, iodine, hydroxy and lower alkyl, cyclohexyl, cyclohexyl bearing one or more substituents selected from the group consisting of chlorine, fluorine, bromine, iodine, hydroxy and lower alkyl, cyclopentyl, cyclopentyl bearing one or more substituents selected from the group consisting of chlorine, fluorine, bromine, iodine, hydroxy and lower alkyl, cycloheptyl, or cycloheptyl bearing one or more substituents selected from the group consisting of chlorine, fluorine, bromine, iodine, hydroxy and lower alkyl; R_5 is hydrogen, or lower alkyl, R_6 is hydrogen, lower alkyl; or acyl; or a pharmaceutically acceptable acid addition salt thereof.

7. A pharmaceutical composition for inducing an anti-emetic effect comprising an anti-emetically effective amount of a compound of the formula



wherein R_1 is hydrogen, lower alkyl or acyl; R_2 and R_3 independently are lower alkyl, alkyl substituted by phenyl, or alkyl substituted by phenyl bearing one or more substituents selected from the group consisting of halogen, trifluoromethyl, lower alkyl, lower alkoxy, nitro, amino, lower alkylamino and dilower alkylamino or a straight or branched chain unsaturated hydrocarbon containing 2 to 7 carbon atoms or R_2 and R_3 together are trimethylene or tetramethylene; R_4 is phenyl; phenyl bearing one or more substituents selected from the group consisting of chlorine, fluorine, bromine, iodine, hydroxy and lower alkyl, cyclohexyl, cyclohexyl bearing one or more substituents selected from the group consisting of chlorine, fluorine, bromine, iodine, hydroxy and lower alkyl, cyclopentyl, cyclopentyl bearing one or more substituents selected from the group consisting of chlorine, fluorine, bromine, iodine, hydroxy and lower alkyl, cycloheptyl, or cycloheptyl bearing one or more substituents selected from the group consisting of chlorine, fluorine, bromine, iodine, hydroxy and lower alkyl; R_5 is hydrogen, or lower alkyl, R_6 is hydrogen, lower alkyl; or acyl; or a pharmaceutically acceptable acid addition salt thereof; and a pharmaceutically acceptable carrier material.

4,707,485

SUBSTITUTED TE[1]TRAHYDROISOQUINOLINE DERIVATIVES HAVING β-ADRENERGIC RECEPTOR ACTIVITY

Carl Kaiser, Haddon Heights, and Lawrence I. Kruse, Haddonfield, both of N.J., assignors to Smithkline Beckman Corporation, Philadelphia, Pa.

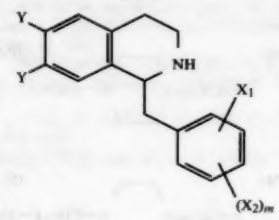
Filed Jun. 24, 1986, Ser. No. 877,932

Claims priority, application United Kingdom, Jul. 23, 1985, 8518634

Int. Cl.[4] A61K *31/47*; C07D *217/20*

U.S. Cl. 514—307 **8 Claims**

1. A compound of structure (I)



in which

Y is halogen;

X_1 is C_{1-4} alkoxy;

m is 0 to 4; and X_2 is C_{1-4} alkoxy, halogen or C_{1-4} alkyl, provided that

(i) when m is 1, 3 or 4, each X_2 is C_{1-4} alkoxy; and,

(ii) when m is 2, at least one X_2 is C_{1-4}

or a pharmaceutically acceptable acid addition salt thereof.

7. A method of producing β-adrenergic receptor antagonism in mammals that comprises administering internally to a subject in need of such inhibition an effective amount of a compound of claim 1.

4,707,486

DIARYL PIPERIDINE CONTAINING ESTERS OF 1,4-DIHYDROPYRIDINES AND CORONARY THERAPEUTIC USE

Dieter Flockerzi; Kurt Klemm, both of Allensbach, and Wolf-Rudiger Ulrich, Constance, all of Fed. Rep. of Germany, assignors to Byk Gulden Lomberg Chemische Fabrik GmbH, Constance, Fed. Rep. of Germany

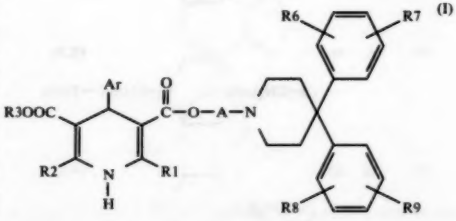
Filed Sep. 30, 1985, Ser. No. 781,808

Claims priority, application Switzerland, Sep. 28, 1984, 4653/84; Sep. 28, 1984, 4652/84

Int. Cl.[4] A61K *31/455*; C07D *401/12, 413/14*

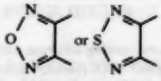
U.S. Cl. 514—318 **18 Claims**

1. A compound of formula I



wherein Ar represents a ring of the formula

in which Y denotes vinylene (—CH=CH—), or a group of the formula



R_1, R_2 and R_3 are identical or different and denote hydrogen, C_1–C_6-alkyl, C_3–C_7-alkoxyalkyl, aryl, aryl-C_1–C_6-alkyl or aryloxy-C_1–C_6-alkyl,

R_4 and R_5 are identical or different and denote hydrogen, hydroxyl, halogen, nitro, cyano, trifluoromethyl, C_1–C_4-alkyl, C_1–C_4-alkoxy, C_1–C_4-alkoxy which is completely or partly substituted by fluorine, C_1–C_4-alkoxycarbonyl, C_2–C_5-acyl, amino or mono- or di-C_1–C_4-alkylamino,

R_6, R_7, R_8 and R_9 are identical or different and denote hydrogen, hydroxyl, halogen, C_1–C_4-alkyl, C_1–C_4-alkoxy, amino, mono- or di-C_1–C_4-alkylamino, C_1–C_4-alkoxy which is completely or partly substituted by fluorine, and

A denotes straight-chain or branched C_2–C_5-alkylene, which is optionally substituted by C_1–C_4-alkoxy or aryl;

or a salt thereof.

17. A medicament composition for treatment or prophylaxis of hypertension, coronary heart disease, disturbance in peripheral and cerebral circulation and/or disease based on an increased retention of water or sodium and which comprises an effective amount of a compound of formula I of claim 1 or a pharmacologically-acceptable salt thereof.

4,707,487

(4-IMIDAZOLYL)PIPERIDINES, THE PREPARATION THEREOF AND THEIR APPLICATION IN THERAPY

Jean-Michel Arrang, Gif /Yvette; Monique Garbarg, Paris; Jean-Charles Lancelot, Tour En Bessin; Jeanne-Marie Lecomte, Paris; Max-Fernand Robba, Caen, and Jean-Charles Schwartz, Paris, all of France, assignors to Institut National de la Sante et de la Recherche Medicale (Inserm), Paris; Universite de Caen, Caen and Societe Civile Bioprojet, Paris, all of, France

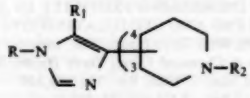
Filed Mar. 17, 1986, Ser. No. 840,956

Claims priority, application France, Mar. 26, 1985, 85 04496

Int. Cl.[4] C07D *401/04, 405/14;* A61K *31/445*

U.S. Cl. 514—326 **12 Claims**

1. A compounds corresponding to the formula



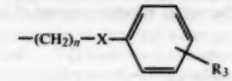
I

in which

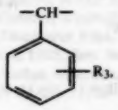
R_1 denotes a hydrogen atom or a methyl or ethyl group,

R denotes a hydrogen atom or the radical R_2, and

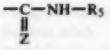
R_2 denotes a linear or branched alkyl group having 1 to 6 carbon atoms; a piperonyl group; a 3-(1-benzimidazolonyl)propyl group; a group of formula



in which n is 0, 1, 2 or 3, X is a single bond or alternatively —O—, —S—, —NH—, —CO—, —CH=CH— or



and R_3 is H, CH_3, halogen, CN, CF_3 or an acyl group —COR_4, R_4 being a linear or branched alkyl group having 1 to 6 carbon atoms, a cycloalkyl group having 3 to 6 carbon atoms or a phenyl group which can bear a CH_3 or F substituent; or alternatively a group of formula



in which Z denotes an O or S atom or a divalent group NH, N—CH_3 or N—CN and R_5 denotes a linear or branched alkyl group having 1 to 8 carbon atoms, a cycloalkyl group having 3 to 6 carbon atoms which can bear a phenyl substituent, a cycloalkyl(3 to 6 C)alkyl(1 to 3 C, linear or branched) group, a phenyl group which can bear a CH_3, halogen or CF_3 substituent, a phenylalkyl(1 to 3 C, linear or branched) group or a naphthyl, adamantyl or p-toluenesulphonyl group, as well as the pharmaceutically acceptable salts thereof.

12. Pharmaceutical composition containing an amount effective to control the release of cerebral histimine and to increase the the rate of removal of cerebral histamine, a compound according to claim 1 and a therapeutically compatible excipient or vehicle.

4,707,488

DOPAMINE-β-HYDROXYLASE INHIBITORS AND USE THEREOF

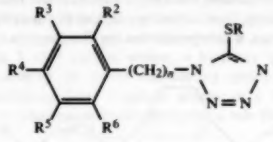
Carl Kaiser, Haddon Heights, and Lawrence I. Kruse, Haddonfield, both of N.J., assignors to Smithkline Beckman Corporation, Philadelphia, Pa.

Filed Feb. 11, 1985, Ser. No. 700,234

Int. Cl.[4] A61K *31/41;* C07D *257/04*

U.S. Cl. 514—381 **31 Claims**

1. A compound of structure (I)



(I)

in which:

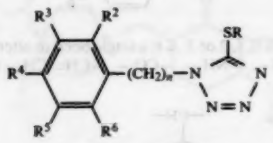
R is hydrogen;

n is 1 to 5; and

R^2 to R^6 are the same or different and are each hydrogen, halogen, hydroxy, C_{1-4}-alkyl, CN, NO_2, SO_2NH_2, CO_2H, $CONH_2$, CHO, CH_2OH, CF_3, C_{1-4}alkoxy, SO_2C_{1-4}alkoxy, SO_2C_{1-4}fluoroalkyl or CO_2C_{1-4}alkyl, provided that, when n is 1 or 2, R^2 to R^6 are not all hydrogen;

or a pharmaceutically acceptable salt or hydrate thereof.

21. A method of inhibiting dopamine-β-hydroxylase activity in mammels which comprises administering internally to a subject in need thereof an effective amount of a compound of structure (III)



(III)

in which:

R is hydrogen or C_{1-4}alkyl;

n is 1 to 5;

R^2 to R^6 are the same or different and are each hydrogen, halogen, hydroxy, C_{1-4}alkyl, CN, NO_2, SO_2NH_2, CO_2H, $CONH_2$, CHO, CH_2OH, CF_3, C_{1-4}alkoxy, SO_2C_{1-4}alkoxy, SO_2C_{1-4}fluoroalkyl or CO_2C_{1-4}alkyl;

or a pharmaceutically acceptable salt or hydrate thereof.

4,707,489

INSECTICIDAL AND/OR ACARICIDAL, INCLUDING TERMICIDAL COMPOSITIONS BASED ON 2,5-DISUBSTITUTED DERIVATIVES OF PYRROLIDINE AND/OR PYRROLINE-1

Jean-Luc Clement; Michèle Lemaire; Catherine Lange, all of Paris; Gérard Lhommet, Champigny S/Marne; Jean-Pierre Celerier, Paris; Jean-Jacques Basselier, Viry Chatillon, and Pierre Cassier, Asnieres, all of France, assignors to Centre National de la Recherche Scientifique (CNRS), Paris, France

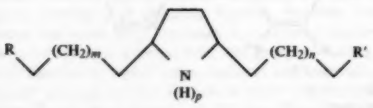
Filed Apr. 25, 1985, Ser. No. 727,057

Claims priority, application France, May 4, 1984, 84 06980

Int. Cl.[4] A01N *43/36*

U.S. Cl. 514—408 **7 Claims**

1. A process for destroying insects or acarians comprising applying to areas where insects or acarians are found an amount of an insecticidal or acaricidal composition effective to destroy said insects or acarians, said insecticidal or acaricidal composition containing in a carrier an effective amount of, but not more than 10 percent by weight based on the total weight of said composition, as an active ingredient for destroying said insects or acarians, a compound having the formula



(I)

wherein

R and R′ each independently represent methyl or methylene,

m and n each independently represent 0 or a whole number ranging from 1 to 12, and

p=0 when the heterocycle is pyrroline-1 or p=1 when the heterocycle is pyrrolidine.

4,707,490

ANTI-HYPERTENSIVE AGENTS

James W. Ryan, and Alfred Chung, both of Miami, Fla., assignors to University of Miami, Miami, Fla.

Continuation of Ser. No. 680,541, Dec. 11, 1984, abandoned, which is a continuation of Ser. No. 524,204, Aug. 18, 1983, abandoned, which is a continuation of Ser. No. 295,589, Aug. 24, 1981, abandoned, which is a continuation of Ser. No. 116,951, Jan. 30, 1980, abandoned, which is a continuation of Ser. No. 958,180, Nov. 6, 1978, abandoned. This application Apr. 10, 1986, Ser. No. 850,055

The portion of the term of this patent subsequent to Sep. 1, 2004, has been disclaimed.

Int. Cl.[4] A61K *31/40;* **C07D** *207/244;* **C07C** *101/72*

U.S. Cl. 514—423 **13 Claims**

1. An angiotensin converting enzyme inhibitor selected from the group consisting of: N-[3-(benzoylphenylalanylthio)-2-D-methylpropanoyl]-L-3,4-dehydroproline, N-(2-benzoylphenylalanylthiopropanoyl)-L-3,4-dehydroproline, and N-(3-benzoylphenylalanylthiopropanoyl)-L-3,4-dehydroproline.

4,707,491

ANTICONVULSANT γ-THIOBUTYROLACTONE DERIVATIVES

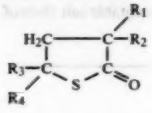
Douglas F. Covey; Jeffrey A. Levine, and James A. Ferrendelli, all of St. Louis, Mo., assignors to Washington University, St. Louis, Mo.

Filed Dec. 20, 1985, Ser. No. 811,919

Int. Cl.[4] A61K *31/38;* **C07D** *333/32*

U.S. Cl. 514—445 **7 Claims**

1. An anticonvulsant compound having the following formula:



wherein

R_1=alkyl or alkenyl having from 1 to about 4 carbon atoms,

R_2=alkyl or alkenyl having from 1 to about 4 carbon atoms,

R_3=H, alkyl or alkenyl having from 1 to about 4 carbon atoms,

R_4=H, alkyl or alkenyl having from 1 to about 4 carbon atoms,

and in which R_1 and R_2 are dissimilar alkyl or alkenyl groups.

4,707,492

METHOD FOR INCREASING FERTILITY IN ANIMALS BY CONTROLLING AND STIMULATING OVULATION

Paula Myers-Keith, West Terre Haute, Ind., assignor to International Minerals & Chemical Corp., Terre Haute, Ind.

Filed May 5, 1986, Ser. No. 859,359

Int. Cl.[4] A61K *31/335*

U.S. Cl. 514—450 **16 Claims**

1. A method for increasing fertility in female animals which comprises the step of administering a fertility increasing amount of monorden to said animal in need thereof thereby increasing the conception rate, incidence of multiple ovulation, and litter sizes.

4,707,493

19-EPI-DIANEMYCIN AS AN ANTICOCCIDIAL AND ANTIBACTERIAL AGENT

Walter D. Celmer, New London; Walter P. Cullen, East Lyme, both of Conn.; Hiroshi Maeda, Chita, Japan; John C. Ruddock, Ash, Near Canterbury, England, and Junsuke Tone, Chita, Japan, assignors to Pfizer Inc.

Continuation of Ser. No. 466,468, Feb. 15, 1983, abandoned. This application Nov. 17, 1986, Ser. No. 931,587

Int. Cl.[4] C07D *309/10*

U.S. Cl. 514—460 7 Claims

1. 19-Epi-dianemycin or a pharmaceutically-acceptable salt thereof.

4,707,494

7-OXABICYCLO(2.2.1)HEPTANE COMPOUNDS USEFUL IN THE TREATMENT OF INFLAMMATION

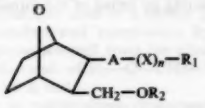
Ravi K. Varma, Belle Mead, N.J.; Carl P. Closek, New Hope, Pa., and Eric M. Gordon, Pennington, N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Aug. 26, 1986, Ser. No. 900,564

Int. Cl.[4] A61K *31/557*; C07D *307/00*

U.S. Cl. 514—469 10 Claims

1. A compound of the formula



wherein R_1 is lower alkyl, alkenyl, or alkynyl of 3–8 carbon atoms; R_2 is lower alkyl, alkenyl or alkynyl of 3–8 carbon atoms; A is —CH_2—CH=CH— or a single bond; X is —CH_2, —$CH(CH_3)$ or —$C(CH_3)_2$; n is an integer from 0 to 9; with the proviso that when the A is a single bond, n is an integer from 1 to 9 including all stereoisomers thereof;

wherein the term lower alkyl or alkyl refers to both straight and branched chain radicals of up to 12 carbons, as well as such groups including a halo-substituent, an alkoxy substituent, halophenyl substituent, a halonaphthyl substituent, a cycloalkyl substituent, an alkylcycloalkyl substituent, an alkylamino substituent, an alkanoylamino substituent, a phenylcarbonylamino substituent, a naphthylcarbonylamino substituent, a nitro substituent, a cyano substituent, a thiol substituent or an alkylthio substituent;

and the term alkenyl contains 3 to 8 carbon atoms and can be substituted with alkyl, or halogen.

6. A composition for treating inflammation in a mammalian species comprising administration of an effective amount of a compound as defined in claim 1 and a pharmaceutically acceptable carrier therefor.

4,707,495

PEPTIC ULCER TREATMENT METHOD

Marvin E. Rosenthale, Princeton; David A. Shriver, Martinsville, and Laurence B. Katz, Lawrenceville, all of N.J., assignors to Ortho Pharmaceutical, Raritan, N.J.

Filed Oct. 28, 1985, Ser. No. 791,673

Int. Cl.[4] A61K *31/215*

U.S. Cl. 514—530 7 Claims

1. A method for topically treating mammalian peptic ulcer disease comprising the steps of:

(a) providing a composition containing an effective amount of a prostaglandin analog in a pharmaceutical carrier suitable for administration to the skin of the mammal to be treated;

(b) applying a unit dose of said composition to contact the skin of said mammal to be treated; and

(c) maintaining said contact for a period of time sufficient for said prostaglandin analog to penetrate the skin; said prostaglandin analog being selected from the group consisting of (11α,13E)-1,11,16-trihydroxy-16-methyl-prost-13-en-9-one; (±)(11α,13E)-11,6-dihydroxy-16-methyl-9-oxo-prost-13-en-1-oic acid methyl ester; (5Z,11α,13E,15R)-11,15-dihydroxy-16,16-dimethyl-9-oxo-prosta-5,13-1-oic acid; and 7-[3-hydroxy-2-(3-hydroxy-4-phenoxy-1-butenyl)-5-oxocyclopentyl]-4,5-heptadienoic acid methyl ester.

4,707,496

INSECT REPELLENT SOAP COMPOSITION

Thomas E. Simmons, Victoria, Australia, assignor to Simmons Nominees Pty. Ltd., Doncaster East, Australia

Filed Apr. 4, 1985, Ser. No. 719,707

Claims priority, application Australia, Jul. 19, 1984, PG6106

Int. Cl.[4] A01N *25/00, 31/00, 37/18, 53/00*

U.S. Cl. 514—531 15 Claims

1. An insect repellent soap composition, which comprises:

(1) from 63.0 to 89.7% by wt of a water soluble soap mixture containing from 4.1 to 7% by wt of a soap of caprylic acid, from 3.8 to 7% of a soap capric acid, from 32.1 to 45% of a soap of lauric acid, from 12 to 17.5% by wt of a soap of myristic acid, from 5.0 to 10% by wt of a soap of palmitic acid, from 1.6 to 3% by wt of a soap of stearic acid, from 3.5 to 5% by wt of a soap of oleic acid and from 0.9 to 5% by wt of a soap of linoleic acid;

(2) from 0.1 to 2% by wt of C_8–C_{18} straight chain fatty acids;

(3) from 10 to 30% by wt of an insect repellent chemical;

(4) from 0.2 to 5% by wt of 3-phenoxybenzyl(±), cis trans-2,2-dimethyl-3-(2,2-dichlorovinyl)cyclopropane-1-carboxylate.

4,707,497

PHENYLETHANOLAMINOTETRALINES, A PROCESS FOR THEIR PREPARATION AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Roberto Cecchi; Robert Boigegrain; Alberto Bianchetti; Elena Poggesi, and Tiziano Croci, all of Milan, Italy, assignors to Sanofi, Paris, France

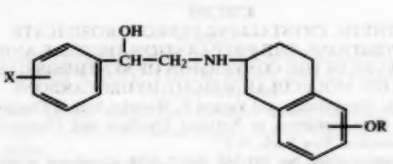
Filed Jul. 10, 1986, Ser. No. 883,961

Claims priority, application France, Jul. 10, 1985, 85 10559; May 7, 1986, 86 06626

Int. Cl.[4] A61K *31/215*; C07C *101/30*

U.S. Cl. 514—647 8 Claims

1. A compound of formula



I

wherein X represents hydrogen, halogen, a trifluoromethyl or a lower alkyl group and R represents hydrogen; a lower alkyl group not substituted or substituted by a cycloalkyl group containing 3 to 7 carbon atoms, a hydroxy group, a lower alkoxy, carboxy or lower carbalkoxy group; a cycloalkyl group containing 3 to 7 carbon atoms; or a lower alkanoal group; or a pharmaceutically acceptable salt thereof.

4,707,498

FLUORINATED DIAMINOALKYNE DERIVATIVES

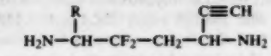
Michael Kolb, Truchtersheim, and David A. Kendrick, Illkirch Graffenstaden, both of France, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

Filed Jan. 14, 1986, Ser. No. 818,848

Int. Cl.[4] C07C *87/24, 87/22*; A61K *31/13*

U.S. Cl. 514—671 10 Claims

1. A fluorinated diaminoalkyne derivative of the formula



wherein R represents hydrogen or C_1–C_4 alkyl.

4,707,499

3-ALKYL-5-(SUBSTITUTED AMINO)METHYL)DIHYDRO-3-PHENYL-2(3H)-FURANONES AND IMINO ANALOGS THEREOF USED FOR TREATMENT OF ARRHYTHMIA

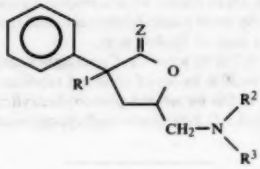
John S. Baran, Winnetka, and Harman S. Lowrie, Northbrook, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Division of Ser. No. 803,751, Dec. 2, 1985, abandoned. This application Dec. 1, 1986, Ser. No. 935,880

Int. Cl.[4] A61K *31/34*

U.S. Cl. 514—471 **12 Claims**

1. A method for treating arrhythmia in mammals comprising administering to a mammal in need of such treatment a therapeutically effective amount of a compound of the formula:



or pharmaceutically acceptable acid addition salts thereof, wherein Z is =O or =NH;

R^1 is alkyl of 1 to 6 carbon atoms;

R^2 is:

(a) hydrogen; or

(b) alkyl of 1 to 6 carbon atoms;

R^3 is:

(a) alkyl of 1 to 6 carbon atoms; or

(b) $-(CH_2)_m-NR^4R^5$;

wherein R^4 and R^5 are independently alkyl of 1 to 6 carbon atoms; and

m is an integer from 2 to 6.

4,707,500

SYNTHETIC CRYSTALLINE FERROBOROSILICATE COMPOSITIONS, THE PREPARATION THEREOF AND THEIR USE IN THE CONVERSION OF SYNTHESIS GAS TO LOW MOLECULAR WEIGHT HYDROCARBONS

James A. Hinnenkamp, and Vernon V. Walatka, both of Cincinnati, Ohio, assignors to National Distillers and Chemical Corporation, New York, N.Y.

Continuation of Ser. No. 751,168, Jul. 2, 1985, abandoned, which is a continuation-in-part of Ser. No. 256,308, Apr. 22, 1981, abandoned, which is a continuation-in-part of Ser. No. 92,127, Nov. 7, 1979, Pat. No. 4,331,641. This application Dec. 29, 1986, Ser. No. 947,132

Int. Cl.[4] C07C *1/04*

U.S. Cl. 518—713 **10 Claims**

1. A method for the conversion of synthesis gas comprising: contacting synthesis gas which comprises hydrogen and carbon monoxide with a catalytically effective amount of a crystalline ferroborosilicate composition, under conversion conditions effective to provide ethane selectivity of at least 40%, said borosilicate composition represented in terms of mole ratios as follows: (0.2 to 15) $M_{2/m}O$:(0.2 to 10) Z_2O_3: (5 to 1000) SiO_2: $Fe_{2/n}O$: (0 to 2000) H_2O wherein M comprises a cation of a quaternary ammonium, metal, ammonium, hydrogen and mixtures thereof, m is the valence of said cation, n is the valence of the iron cation, and Z is boron, said composition containing ion-exchanged palladium or palladium impregnated onto said composition.

4,707,501

POLYURETHANE FOAM CATALYSTS THAT ELIMINATE POLYUREA-CONTAINING POLYOL BASED MASTERBATCH CURE DRIFT

Robert G. Petrella, Allentown, and Michael Scarpati, Leighton, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Feb. 13, 1987, Ser. No. 14,504

Int. Cl.[4] C08J *9/00*

U.S. Cl. 521—115 **13 Claims**

1. In a method for preparing a high resiliency polyurethane foam by the reaction of a polyisocyanate with a polyurea dispersion-containing polyol based masterbatch composition also containing an amine catalyst for the polyurethane reaction, the improvement which comprises employing as the catalyst a composition consisting essentially of

(a) 5 to 15 wt % triethylenediamine,

(b) 20 to 35 wt % 4-(2-dimethylaminoethyl) morpholine,

(c) 20 to 35 wt % N,N,N',N'-tetramethyl-1,2-diamino-2-methylpropane,

(d) 10 to 25 wt % bis(N,N-dimethylaminoethyl) ether, and

(e) 5 to 40 wt % of a N-hydroxyalkyl quaternary ammonium acid salt prepared by reacting an amine of the formula

where

R, R_1 and R_2 are independently alkyl or hydroxyalkyl alkyl groups of 1–20 carbon atoms, cycloalkyl groups of 3–8 carbon atoms, aralkyl, aryl, alkenyl groups of 2–20 carbon atoms or alkynyl groups of 2–6 carbon atoms, or

R, R_1 and R_2 together with a nitrogen atom form an N-substituted heterocyclic 5–7 atoms ring structure, with an alkylene oxide having 2–22 carbon atoms in the presence of an acid.

4,707,502

PROCESS FOR THE PRODUCTION OF URETHANE-MODIFIED POLYISOCYANATE PREPARATIONS, THE POLYISOCYANATE PREPARATIONS OBTAINABLE BY THIS PROCESS AND THEIR USE IN THE PRODUCTION OF PLASTICS BASED ON POLYISOCYANATES

Werner Rasshofer, Cologne; Otto Ganster, Odenthal; Brund Luckas, Leverkusen, and Ludwig Rottmaier, Odenthal-Glocebusch, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jul. 23, 1986, Ser. No. 889,037

Claims priority, application Fed. Rep. of Germany, Aug. 1, 1985, 3527531

Int. Cl.[4] C08G *18/14*

U.S. Cl. 521—159 **5 Claims**

1. Process for the production of urethane modified polyisocyanate preparations having an isocyanate content of 5 to 32% by weight by the reaction of

(a) polyisocyanates of the diphenylmethane series or polyisocyanate mixtures of the diphenylmethane series with

(b) organic polyhydroxyl compounds

using an NCO/OH equivalent ratio of from 2.5:1 to 50:1, characterised in that the organic polyhydroxyl compounds (b) used are

(b1) urazoles or isocyanurates having OH numbers in the range of from 168 to 721 containing 2 or 3 alcoholic hydroxyl groups and carrying hydroxyalkyl substituents, optionally with ether bridges, on the nitrogen, or mixtures thereof, or

(b2) mixtures of the polyhydroxyl compounds mentioned under b1) with up to 50 hydroxy equivalents percent of other organic polyhydroxyl compounds.

4,707,503

RADIATION-CURABLE ORGANOPOLYSILOXANE COMPOSITIONS

Kunio Itoh; Fumio Okada; Yasushi Yamamoto, and Hisashi Aoki, all of Gunma, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 607,669, May 7, 1984, abandoned. This application Nov. 21, 1985, Ser. No. 800,087

Claims priority, application Japan, May 10, 1983, 58-81360

Int. Cl.[4] C08G *75/04, 77/28*

U.S. Cl. 522—99 **6 Claims**

1. A radiation-curable organonpolysiloxane composition which comprises:

(A) an aliphatic unsaturation-containing organopolysiloxane containing at least two of the organosiloxane units represented by the general unit formula

$$(CH_2{=}CR^2{-}X{-}R^1{+}SiR^3{}_mO_{\frac{3-m}{2}}$$

in which R^1 is a divalent hydrocarbon group, R^2 is a hydrogen atom or a methyl group, R^3 is a substituted or unsubstituted monovalent hydrocarbon group, X is a group selected from the class consisting of —O—$(CH_2)_2$S— and —CH_2—O—CH_2—S—; and m is a number or 0, 1 or 2; and

(B) an organosilicon compound having at least two mercapto groups —SH per molecule in such an amount as to provide from 0.01 to 100 moles of the mercapto groups per mole of the aliphatically unsaturated group $CH_2{=}CR^2$— in the component (A).

4,707,504

POROUS FILLERS IN POLYMERIZABLE COMPOSITIONS

Michael Walkowiak; Klaus Nehren, both of Leverkusen; Wolfgang Podszun, Cologne, and Werner Finger, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Aug. 6, 1985, Ser. No. 762,987

Claims priority, application Fed. Rep. of Germany, Aug. 22, 1984, 3430801

Int. Cl.[4] C08F *2/44;* **C08K** *9/06, 3/36;* **A61K** *5/06*

U.S. Cl. 523—109 **17 Claims**

1. In a polymerizable composition containing a polymerizable monomer and a microporous inorganic filler, the improvement which comprises employing as the filler one which has

(a) an average particle size of 0.5 to 50μ;

(b) a BET surface area of at least 200 m^2/g;

(c) a pore volume of 0.7 to 5 ml/g, and

(d) a pore diameter of 10 to 50 nm.

4,707,505

GLASS FIBER REINFORCED PROPYLENE-ETHYLENE COPOLYMER BASE RESIN COMPOSITION

Yoshio Matsuno, Machida; Toshio Miyamoto, Tokyo, and Hideyo Morita, Sakai, all of Japan, assignors to Nissan Motor Co. Ltd., Yokohama, Japan

Filed Jul. 31, 1986, Ser. No. 891,375

Claims priority, application Japan, Aug. 10, 1985, 60-176011

Int. Cl.[4] C08K *3/40, 7/14, 9/06*

U.S. Cl. 523—203 **7 Claims**

1. A glass fiber reinforced resin composition suitable as a molding material for automobile instrument panels, the resin composition comprising an essential blend which consists of:

55–77 wt % of a propylene-ethylene block copolymer which is a least partially modified by graft copolymerization with an unsaturated carboxylic acid or its derivative and exhibits a melt flow index of from 3 to 9 g/10 min at 230° C. under load of 2160 g;

5–15 wt % of an ethylene-propylene rubber in which the content of ethylene is in the range from 60 to 85 wt % and which exhibits a Mooney viscosity, ML_{1+4}(100° C.), of from 60 to 80; and

18–30 wt % of a glass fiber having a filament diameter of from 8 to 15 μm,

the resin composition being pelletized from a melted state such that the glass fiber dispersed in the pelletized resin composition has a mean filament length not smaller than 550 μm.

4,707,506

POLYESTERETHER ELASTOMER COMPOSITIONS HAVING IMPROVED FLAME RETARDANT PROPERTIES

Ronald L. Markezich, Williamsville, N.Y., assignor to Occidental Chemical Corporation, Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 740,600, Jun. 3, 1985, Pat. No. 4,613,651. This application Dec. 11, 1985, Ser. No. 807,892

The portion of the term of this patent subsequent to Sep. 23, 2003, has been disclaimed.

Int. Cl.[4] C08L *67/02*

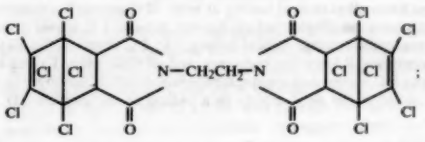
U.S. Cl. 524—89 **7 Claims**

1. A flame retardant thermoplastic polyesterether composition comprising

(a) from about 40 to about 85 percent by weight of a polyesterether elastomer prepared from dimethyl terephthalate, polyether glycol and 1,4-butanediol;

(b) from about 1.0 to about 40 percent by weight of antimony trioxide;

(c) at least about 5 percent by weight of a chlorinated bisimide of the formula



(d) about 0.05 to about 5.0 percent polytetrafluoroethylene.

4,707,507

2,2,6,6-TETRAMETHYL QUATERNARY AMMONIUM HALIDES AND SYNTHETIC RESIN AND STABILIZER COMPOSITIONS

Mitsuo Akutsu, Tokyo, and Mitsuharu Kanai, Saitama, both of Japan, assignors to Adeka Argus Chemical Co., Ltd., Urawa, Japan

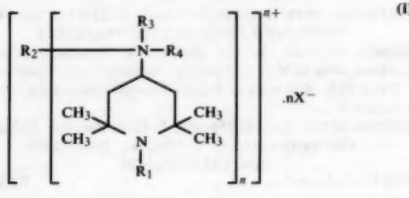
Filed Sep. 4, 1986, Ser. No. 904,130

Claims priority, application Japan, Sep. 4, 1985, 60-195564

Int. Cl.[4] C08K *5/34*

U.S. Cl. 524—99 **23 Claims**

1. 2,2,6,6-Tetramethyl piperidyl quaternary ammonium halides having the formula:



(I)

wherein:

R_1, R_3 and R_4 are alkyl having from one to about twelve carbon atoms;

n is 1 or 2;

when n is 1, R_2 is alkyl having from one to about twelve carbon atoms; and

when n is 2, R_2 is alkylene having from one to about twelve carbon atoms; and

X is halogen as well as stabilizer compositions and synthetic resin compositions containing the same.

4,707,508

LONG-SHELFLIFE CONCENTRATED AQUEOUS SOLUTIONS OF MELAMINE-FORMALDEHYDE CONDENSATES, PREPARATION AND USE THEREOF

Stefan Pieh, Leonding, and Johann Krammer, Linz, both of Austria, assignors to Chemie Linz Aktiengesellschaft, Linz, Austria

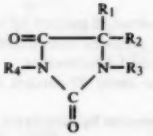
Filed Sep. 30, 1986, Ser. No. 913,236

Claims priority, application Fed. Rep. of Germany, Oct. 4, 1985, 3535501

Int. Cl.[4] C08L *61/22*

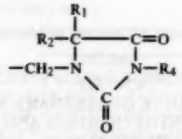
U.S. Cl. 524—106 **10 Claims**

1. Long-shelflife concentrated aqueous solutions of sulfo-containing melamine-formaldehyde condensates having a content of hydantoin derivatives of the formula (I)



I

in which R_1 and R_2 independently of each other denote hydrogen or an alkyl radical having at most 10 C atoms, R_4 denotes hydrogen, an alkylol radical having at most 4 C atoms or an aminocarbonylalkyl radical having 0 to 3 C atoms in the alkyl moiety and R3 denotes hydrogen, and alkylol radical having at most 4 C atoms, and aminocarbonylalkyl radical having 0 to 3 C atoms in the alkyl moiety or a radical of the formula (II)



II

in which R_1, R_2 and R_4 are as defined in the formula (I) said aqueous solution of condensates being produced by a process which comprises condensing melamine, formaldehyde and alkali metal sulfite in aqueous solution in a two stage reaction, A pH of 8–12 being maintained in the first stage, a pH of 3–7 being maintained in the second stage and finally a pH of 7–13 being set, the hydantoin derivative being added at any desired time in the condensation process.

4,707,509

TRIS-ORGANOPHOSPHITE COMPOSITIONS HAVING IMPROVED HYDROLYTIC STABILITY

Michael H. Fisch, Wayne; Barbara A. Hegranes, Pompton Plains, both of N.J., and George A. Seubert, Jr., Massapequa Park, N.Y., assignors to Argus Chemical Corporation, Brooklyn, N.Y.

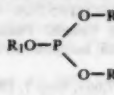
Division of Ser. No. 627,956, Jul. 5, 1984, Pat. No. 4,650,894. This application Sep. 2, 1986, Ser. No. 902,379

Int. Cl.[4] C08K *5/34*

U.S. Cl. 524—147 **7 Claims**

1. A stabilizer composition capable of enhancing resistance to deterioration by heat and/or light of synthetic resin compositions comprising a phenolic antioxidant and a tris-organophosphite composition having an improved hydrolytic stability, comprising

(1) a tris-organophosphite of the formula:



I

wherein:

R_1, R_2 and R_3 are selected from the group consisting of alkyl, alkenyl, aryl, alkylaryl and aralkyl groups together aggregating at least fourteen carbon atoms up to about sixty carbon atoms; and

(2) a long-chain aliphatic amine in an amount to improve the hydrolytic stability of the phosphite and having the formula:

II

wherein:

R_4, R_5 and R_6 are selected from the group consisting of hydrogen; aliphatic groups having from one to about thirty-six carbon atoms; and hydroxyalkyl having from two to about six carbon atoms; one of R_4, R_5 and R_6 is an aliphatic group having at least ten carbon atoms, and the remaining of R_4, R_5 and R_6 are selected from hydrogen, alkyl having from one to four carbon atoms and hydroxyalkyl.

4,707,510

FLAME RETARDANT RESIN COMPOSITION

Tatsuhiko Imai, Izumi, and Masuo Kawasawa, Sakai, both of Japan, assignors to Daicel Chemical Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 898,768, Aug. 14, 1986, which is a continuation of Ser. No. 709,003, Mar. 7, 1985, abandoned. This application Mar. 20, 1987, Ser. No. 29,345

Int. Cl.[4] C08K *5/06*

U.S. Cl. 524—281 **20 Claims**

1. A resin composition which comprises 100 parts by weight of a normally flammable thermoplastic resin selected from the group consisting of impact-resistant polystyrenes containing an elastomer, styrene-acrylonitrile copolymers, acrylonitrile-butadiene-styrene graft polymers, acrylonitrile-butadiene-α-methyl styrene-methacrylate graft polymers, copolymers of styrene and acrylic acid, methacrylic acid or esters thereof, copolymers of styrene and maleic anhydride or ester thereof and acrylonitrile-styrene-ethylenepropylene tetrapolymers and 9 to 55 parts by weight of an additive mixture consisting essentially of (A) 3 to 35 parts by weight of a tetrahalogenated bisphenol A carbonate oligomer, (B) 3 to 35 parts by weight of bis(tribromophenoxy)ethane and (C) 0.5 to 15 parts by weight of antimony trioxide, wherein the ratio of component (A) to component (B) is from 25:75 to 75:25 by weight.

4,707,511

THERMOPLASTICALLY MOLDABLE COMPOSITIONS

Omar M. Boutni, Mt. Vernon, Ind., assignor to General Electric Company, Mt. Vernon, Ind.

Filed Dec. 17, 1985, Ser. No. 809,275

Int. Cl.[4] C08K *5/10*; C08L *69/00, 67/02*

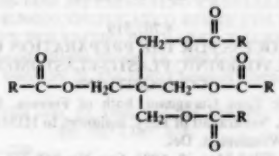
U.S. Cl. 524—311 **7 Claims**

1. A thermoplastically injection moldable, synthetic resin composition, which comprises;

a polyester resin prepared by condensation of a diol selected from the group consisting of the cis- and the trans-isomer of 1,4-cyclohexanedimethanol with a hexacarbocyclic dicarboxylic acid selected from the group consisting of isophthalic acid, terephthalic acid and mixtures thereof;

a quantity of aromatic polycarbonate resin sufficient to render the polyester injection-moldable; and

an effective amount for mold-release of a mold-release additive selected from compounds which are of formula:



wherein R represents aliphatic hydrocarbyl of 13 to 35 carbon atoms, inclusive.

4. The composition of claim 1 wherein the additive is pentaerythritoltetrastearate.

5. The composition of claim 1 wherein the additive also comprises a fatty acid of 13 to 35 carbon atoms, inclusive.

4,707,512

POLYESTER RESIN COMPOSITION

Seiichiro Maruyama; Hironori Hayashida; Kazumasa Morita, and Yoshitaka Shiraishi, all of Kitakyushu, Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

Filed Jul. 11, 1985, Ser. No. 853,982

Claims priority, application Japan, Jul. 16, 1984, 59-146119; Feb. 28, 1985, 60-39676; Feb. 28, 1985, 60-39677; Apr. 9, 1985, 60-74704; Apr. 9, 1985, 60-74707

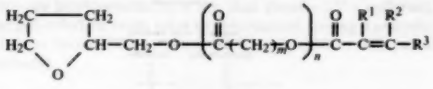
Int. Cl.[4] C08L *67/02, 51/06*

U.S. Cl. 524—504 **6 Claims**

1. A polyester compositon, comprising:

(A) a polyalkylene terephthalate or a copolymer composed of polyalkylene terephthalate and

(B) a modified copolymer of ethylene and α-olefin prepared by grafting (1) from 0.01 to 2.0 wt % of an ester of an α,β-unsaturated carboxylic acid of the formula (I):



(I)

wherein n is zero or an integer up to 4; m is an integer of from 1 to 10; R^1 and R^2 respectively represent a hydrogen atom, or an alkyl group and R^3 represents a hydrogen atom and alkyl group or a carboxyl group, based on the amount of α-olefin-ethylene copolymer, or (2) from 0.01 to 2.0 weight percent of said ester of an α,β-unsaturated carboxylic acid represented by the formula (i), based on the amount of the α-olefin-ethylene copolymer, and an α,β-unsaturated carboxylic acid or an anhydride thereof with a copolymer of ethylene and an α-olefin prepared by copolymerizing not less than 50 mol % ethylene and not more than 50 mol % of an α-olefin having not less than three carbon atoms.

4,707,513

TOUGH THERMOPLASTIC NYLON COMPOSITIONS

Massimo Baer, Longmeadow, Mass., assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 314,348, Oct. 26, 1981, Pat. No. 4,584,344, which is a continuation-in-part of Ser. No. 306,971, Sep. 30, 1981, abandoned, which is a continuation-in-part of Ser. No. 202,956, Nov. 3, 1980, abandoned. This application Mar. 11, 1986, Ser. No. 838,644

The portion of the term of this patent subsequent to Apr. 22, 2003, has been disclaimed.

Int. Cl.[4] C08L *77/06*

U.S. Cl. 524—504 **23 Claims**

1. A multiphase thermoplastic composition consisting essentially of 55 to 99 parts by weight of a polyamide matrix resin of number average molecular weight in the range of about 5000 to 30,000 and 1 to 45 parts by weight of a multiphase core//-shell polymer comprising about 50 to about 90 parts by weight of a cross-linked elastomer core and about 10 to about 50 parts by weight of a rigid thermoplastic polymer shell of glass transition temperature at least about 35° C., comprising from about 1 to about 20 parts by weight of an interpolymerized ethylenically unsaturated monomer containing a hydroxy group, based on 100 parts by weight of shell polymer, wherein the multiphase core//shell polymer has a core weight average particle diameter of at least about 0.3 micron and rigid shell of average thickness of at least about 0.025 micron.

4,707,514

RESIN COMPOSITION FOR SOFT BUMPERS

Hiroshi Katsuki, and Akio Daimon, both of Chiba, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Jul. 11, 1986, Ser. No. 884,451

Claims priority, application Japan, Jul. 12, 1985, 60-154800

Int. Cl.[4] C08L *53/00*

U.S. Cl. 524—505 **9 Claims**

1. A resin composition comprising (a) 100 parts by weight of a selectively hydrogenated block copolymer having at least two mono-alkenyl or mono-alkenylidene aromatic hydrocarbon polymer blocks A having a number average molecular weight of from 5,000 to 15,000 and at least one partially or completely hydrogenated aliphatic conjugated diene hydrocarbon polymer block B having a number average molecular weight of from 10,000 to 75,000, (b) from 10 to 100 parts by weight of an ethylene-propylene copolymer rubber having a Mooney viscosity of from 15 to 50 as measured at 100° C. and an intrinsic viscosity of from 1.2 to 2.0 dl/g as measured in a xylene solution at 70° C., (c) from 200 to 400 parts by weight of a propylene-ethylene block copolymer having a melt flow rate of from 10 to 30 g/10 min and an ethylene content of from 5 to 15% by weight, and (d) from 20 to 200 parts by weight of a non-aromatic diluent oil for rubber.

4,707,515

MOISTURE-CURABLE SEALANT COMPOSITIONS

Heinz G. Gilch, Bad Homburg, and Wolfgang Haar, Oberursel, both of Fed. Rep. of Germany, assignors to USM Corporation, Farmington, Conn.

Filed Apr. 11, 1986, Ser. No. 850,468

Claims priority, application United Kingdom, Apr. 26, 1985, 8510690

Int. Cl.[4] C08F *8/32*

U.S. Cl. 524—506 **16 Claims**

1. A flowable sealant composition comprising a fluid prepolymer material corresponding to a condensation reaction product of an at least substantially linear alkyl acrylate ester polymer comprising a homopolymer of n-butylacrylate, or a copolymer of n-butylacrylate with ethyl hexylacrylate or methylacrylate or styrene or with methylacrylate and styrene wherein said copolymer comprises not less than 70% by weight n-butylacrylate, said acrylate ester polymer having a

viscosity in the range of about 50 to about 2,000 Pas determined using an 80% solution in xylene at 23° C. and a glass-transition temperature (DSC measurment method) of less than −15° C. with a hydrolysable silane having a saturated organo functional group reactive with ester groups of the polymer, said hydrolysable silane comprising one or more of γ-amino propyl triethoxysilane, γ-amino propyl trimethoxysilane and γ-amino propyl methyl diethoxysilane, the acrylate ester polymer and silane being selected and used in quantities to provide a fluid prepolymer material which is soluble as defined and which is curable by exposure to atmospheric moisture to a resilient solid.

4,707,516

POLYMERIC SULFOXIDE BASED ON THE POLYMER OF VINYLALCOHOL

Václav Janouch, Prague; Hana Hrudková , Unhost, and Pavel Cefelín, Prague, all of Czechoslovakia, assignors to Ceskoslovenskla akademie ved, Czechoslovakia

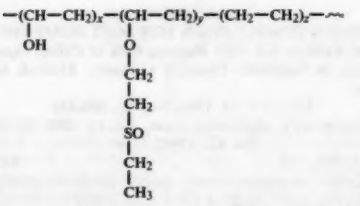
Filed Aug. 1, 1986, Ser. No. 892,484

Claims priority, application Czechoslovakia, Aug. 9, 1985, 5813-85

Int. Cl.⁴ C08F *8/34*

U.S. Cl. 525—60 **1 Claim**

1. A polymeric sulfoxide based on a polymer or copolymer of vinylalcohol, said polymeric sulfoxide having the formula I,



I

where x and y are both greater than 0, z=0–0.8, and $x+y+z=1$.

4,707,517

POLYMER COMPOSITION

David J. Bullen, Falkirk, United Kingdom, and Jeffrey D. Umpleby, Ferney-Voltaire, France, assignors to BP Chemicals Limited, London, England

Filed Jul. 15, 1985, Ser. No. 755,267

Claims priority, application United Kingdom, Jul. 20, 1984, 8418591

Int. Cl.⁴ C08L *51/04*

U.S. Cl. 525—72 **14 Claims**

1. A thermoformable and crosslinkable composition comprising

(A) a crosslinkable thermoplastic component which is a silane-modified organic polymer having hydrolysable groups attached to the silicon atoms thereof,

(B) 0.002 to 2.0 weight %, based on the weight of the crosslinkable component, of a fluorocarbon polymer and

(C) a silanol condensation catalyst.

4,707,518

RUBBER-MODIFIED EPOXY ADHESIVES

Dilipkumar N. Shah, 4121 Canterbury Dr., Erie, Pa. 16506

Filed Oct. 16, 1986, Ser. No. 919,523

Int. Cl.⁴ C08L *9/02*; C08G *59/68*

U.S. Cl. 525—122 **3 Claims**

1. An epoxy resin composition comprising:

(a) At least one epoxy-functional adduct of an epoxy resin having more than one epoxy group and a rubber modifier selected from the group consisting of copolymers of butadiene and at least one monomer selected from the group consisting of acrylonitrile and methacrylonitrile, said rubber modifier being characterized by the presence of at least two functional groups which are reactive with an epoxide group said adduct being further characterized by the presence of more than one epoxy group; and

(c) a curing agent consisting essentially of a mixture of at least two different Lewis acid complexes, the gel time of one of said different Lewis and complexes being different from and less than the gel time of the other.

4,707,519

PROCESS FOR THE PREPARATION OF POLYOLEFINIC PLASTO-ELASTOMERIC COMPOSITIONS

Sergio Forti; Enea Garagnani, both of Ferrara, and Daniele Romanini, Novara, all of Italy, assignors to HIMONT Incorporated, Wilmington, Del.

Filed May 28, 1986, Ser. No. 868,274

Claims priority, application Italy, May 31, 1985, 20992 A/85

Int. Cl.⁴ C08L *61/10*

U.S. Cl. 525—133 **6 Claims**

1. In a process for the preparation of a plastoelastomeric composition in which a mixture comprising a molten olefinic polymer, dispersed therein an unsaturated elastomeric terpolymer of 2 olefinic monomers and a diene monomer, a non-halogenated phenolic resin at 1–20 parts by weight per 100 parts of said terpolymer, and zinc oxide at a ratio to said phenolic resin of 0.5:1–6:1, is masticated at a temperature at which at least partial crosslinking of said terpolymer occurs, the improvement in which said mixture comprises p-toluenesulfonic acid at a weight ratio to said phenolic resin of 0.01:1–0.4:1.

4,707,520

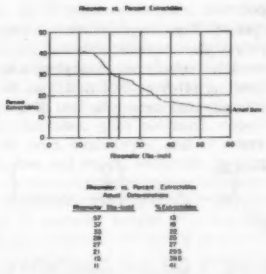
COMPOSITION BASED ON WATER-CURABLE THERMOPLASTIC POLYMERS AND METAL CARBOXYLATE SILANOL CONDENSATION CATALYSTS

Michael J. Keogh, Bridgewater, N.J., assignor to Union Carbide Corporation, Danbury, Conn.

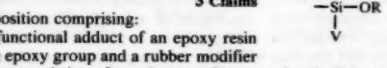
Filed Aug. 21, 1985, Ser. No. 767,872

Int. Cl.⁴ C08F *8/00*

U.S. Cl. 525—245 **24 Claims**



1. A composition of matter comprising a preformed, thermoplastic polymer based on a major proportion of ethylene, said thermoplastic polymer having pendant silane moieties of the formula:



wherein R is a straight chain hydrocarbon radical having 4 to

18 carbon atoms or a branched chain hydrocarbon radical having 3 to 18 carbon atoms, each V is a hydrocarbon radical having 1 to 18 carbon atoms inclusive or an —OR radical wherein R is as previously defined; and as the sole silanol condensation catalyst a metal carboxylate in an amount of about 0.1 percent to about 5 percent by weight based on the weight of said preformed polymer.

4,707,521

PROCESS FOR METALLATING CRYSTALLINE ETHYLENE-NONCONJUGATED DIENE POLYMERS AND GRAFT POLYMERS PREPARED THEREFROM

Calvin P. Esneault, Baton Rouge, La., and Gary K. Lund, Ogden, Utah, assignors to The Dow Chemical Company, Midland, Mich.

Filed Mar. 12, 1986, Ser. No. 839,301
Int. Cl.[4] C08F *8/42*
U.S. Cl. 525—250 **26 Claims**

1. A process for metallating a particulate, crystalline ethylene polymer having polymerized therein, bsed upon polymer weight, from about 90 to about 99.5 percent ethylene and from about 0.5 to about 10 percent nonconjugated diene which comprises:

a. heating an admixture of the particulate polymer and a nonreactive, saturated organic hydrocarbon solvent, the admixture having an original settling volume, to a temperature and for a period of time sufficient to swell the polymer particles and provide the polymer, after being cooled to ambient temperature, with an expanded settling volume which is greater than the original settling volume; and

b. adding at least one lithium alkyl compound and at least one activating compound to the heated admixture of swollen polymer particles.

4,707,522

LOW VISCOSITY, SEMICRYSTALLINE CHLORINATED POLYETHYLENE RESINS AND ARTICLES FORMED THEREFROM

Keith E. Stephens, and Andre J. Uzee, both of Baton Rouge, La., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 5, 1986, Ser. No. 859,597
Int. Cl.[4] L08F *8/22*
U.S. Cl. 525—334.1 **8 Claims**

1. A semicrystalline chlorinated polyethylene resin having a chemically combined chlorine content of from about 20 to about 33 percent by weight of polymer, a heat of fusion of from about 7.5 to about 16 calories per gram, a melt viscosity, measured with a capillary rheometer at a temperature of 190° Centigrade and a shear rate of 145 reciprocal seconds, of from about 5,000 to about 11,000 poise (500 to 1100 pascal seconds), a lightly stabilized 100 percent modulus of from about 150 to about 750 pounds per square inch and a formulated low temperature brittleness rating of less than about −25° Centigrade, the polyethylene resin, prior to chlorination, having a viscosity of from about 2000 to about 9000 poise (200 to 900 pascal seconds).

4,707,523

MAGNETIC PARTICLES

Manchium Chang, Los Angeles; Michael S. Colvin, Malibu; Alan Rembaum, Pasadena, and Gil F. Richards, Duarte, all of Calif., assignors to California Institute of Technology, Pasadena, Calif.

Filed Oct. 11, 1985, Ser. No. 786,649
Int. Cl.[4] C02F *8/42*
U.S. Cl. 525—372 **22 Claims**

1. A method of producing magnetic polymeric particles comprising the steps of:

combining a polymer containing organic nitro groups on the basis of from 5 percent nitration based on monomer groups up to four nitro groups per every monomer group with acid in the presence of a metal oxidizable by said nitro groups;

oxidizing the metal to metal oxide; and

depositing the metal oxide on the surface of the polymer to form a magnetic metal oxide containing complex at the site of said nitro groups.

4,707,524

CONTROLLED-RHEOLOGY POLYPROPYLENE

Raymond J. Ehrig, Pittsburgh, and Richard C. Weil, Monroeville Borough, both of Pa., assignors to Aristech Chemical Corporation, Pittsburgh, Pa.

Filed May 6, 1986, Ser. No. 860,356
Int. Cl.[4] C08F *8/00*
U.S. Cl. 525—387 **8 Claims**

1. Method of modifying the processing characteristics of polypropylene comprising admixing with said polypropylene about 50 to 10,000 ppm of a peroxide compound having a half-life of from about 1 to about 10 hours at 128° C. and which does not degrade into t-butyl alcohol, melting the mixture under thermal mechanical action, and forming a solid polypropylene product free of peroxide compound and free of t-butyl alcohol emissions, whereby the molecular weight of the polypropylene product is reduced, the melt flow is increased, and the molecular weight distribution is made narrower.

4,707,525

OXYMETHYLENE POLYMER MOLDING COMPOSITIONS HAVING ENHANCED IMPACT RESISTANCE AND ARTICLE MOLDED THEREFROM

H. Leslie LaNieve, III, Warren, N.J.; Robert S. Drzal, Naugatuck, and Benjamin S. Ehrlich, Cheshire, both of Conn., assignors to Celanese Corporation, New York, N.Y.

Continuation of Ser. No. 797,800, Nov. 15, 1985, abandoned, which is a continuation of Ser. No. 625,954, Jun. 29, 1984, abandoned. This application Nov. 14, 1986, Ser. No. 930,989
Int. Cl.[4] C08G *60/00, 63/76*
U.S. Cl. 525—399 **21 Claims**

1. An oxymethylene polymer molding composition which is capable of being molded to form articles exhibiting enhanced impact strength, comprising an intimate blend of:

(a) from about 5 to about 50 weight percent based upon the total weight of the composition of an elastomeric polyurethane, which is the reaction product of:

(i) 4,4'-methylenebis(phenyl isocyanate),

(ii) polyoxytetramethylene glycol having a molecular weight within the range of about 1500 to about 3000, and

(iii) at least one diol extender selected from the group consisting of aliphatic straight chain diols having from 2 to about 6 carbon atoms, bis(2-hydroxy-ethyl) ether of hydroquinone, and bis(2-hydroxy-ethyl) ether of resorcinol,

said diol extender being used in the reaction within the amount of about 0.5 to about 2.5 equivalents of extender per equivalent of said polyoxytetramethylene glycol, and said phenyl isocyanate being used in the reaction in an amount such that the ratio of isocyanate groups to total hydroxyl groups is within the range of about 1.0: 1.0 to about 1.08:1.0, and

(b) from about 50 to about 95 weight percent based upon the total weight of the composition of an oxymethylene polymer.

4,707,526
TACKIFIER COMPOSITION

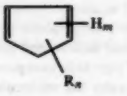
Makoto Sasaki, Yokohama; Masaki Yamakawa, Zama; Toshifumi Hirose, and Katsuhiko Isayama, both of Kobe, all of Japan, assignors to Nippon Oil Co., Ltd., Minato and Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, both of, Japan

Filed Mar. 24, 1987, Ser. No. 29,612
Claims priority, application Japan, Mar. 25, 1986, 61-64897
Int. Cl.[4] C08G *65/48*
U.S. Cl. 525—404 7 Claims

1. A tackifier composition which comprises:

(a) 100 parts by weight of a polyether having at least one reactive silicon group;

(b) 10 to 140 parts by weight of a phenolic hydroxyl group-containing cyclopentadiene resin which is obtained by copolymerization of 100 parts by weight of at least one component A selected from the group consisting of five-membered ring compounds of the following general formula having conjugated double bonds, and Diels-Alder reaction adducts thereof,



in which H is a hydrogen atom, R is an alkyl group having from 1 to 3 carbon atoms, and m and n are each an integer of 0 or at least 1 provided that m+n=6, with 5 to 200 parts by weight of at least one component B selected from the group consisting of monohydric and polyhydric phenols and alkyl-substituted products thereof; and

(c) from 0.1 to 10 parts by weight of a curing catalyst.

4,707,527
MULTICOMPONENT SYSTEMS BASED ON POLYPYRROLE

Mark A. Druy; Sukant K. Tripathy, both of Arlington, and Michael F. Rubner, Chelmsford, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Continuation-in-part of Ser. No. 635,986, Jul. 30, 1984, Pat. No. 4,644,037. This application Dec. 16, 1985, Ser. No. 809,459
Int. Cl.[4] C08L *17/00, 49/06, 83/04;* C25D *1/00*
U.S. Cl. 525—417 17 Claims

1. A composition comprising a polypyrrole having incorporated therein an uncharged polymer component having more than one segment wherein at least one segment is elastomeric, the uncharged polymer component being present in an amount of at least about 10 weight percent of the polypyrrole present, the elastomeric segment having a use temperature greater than its glass transition temperature.

4,707,528
POLYAMIDE RESIN COMPOSITION

Junji Koizumi; Kouji Sasaki, and Junichiro Naito, all of Aichi, Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed Jul. 25, 1985, Ser. No. 758,802
Claims priority, application Japan, Jul. 30, 1984, 59-157301; Oct. 11, 1984, 59-211239
Int. Cl.[4] C08L *77/00*
U.S. Cl. 525—432 3 Claims

1. A polyamide resin composition comprising a blend of a polyamide resin being from 50% to 90% by weight based on said polyamide resin composition, and a composition (A) being from 10% to 50% by weight based on said polyamide resin composition, said composition (A) comprising (i) a polyimide-polyether rubber block copolymer or polyolefin resin, and (ii) a tackiness providing resin, with either of said polyamide-polyether rubber block copolymer or said polyolefin resin being from 80 to 20% by weight based on said composition (A), and said tackiness providing resin being from 20 to 80% by weight based on said composition (A).

4,707,529
POLY(SILOXANE)-MODIFIED EPOXY RESINS

Dwight K. Hoffman, and Reet T. Fernandez, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jun. 27, 1985, Ser. No. 749,249
Int. Cl.[4] C08L *63/00;* C08F *283/10*
U.S. Cl. 525—476 18 Claims

1. A dispersion which comprises an uncured epoxy compound as a continuous phase having dispersed therein and grafted thereto an insoluble siloxane polymer, which dispersion is formed by contacting at elevated temperature (1) a functionalized, uncured epoxy compound adduct which is the reaction product of an uncured epoxy compound and a minor amount of a functional monomer and (2) a siloxane polymer having a vinyl functionally capable of reacting with the functionality of the adduct, whereby an insoluble dispersion of grafted siloxane polymer in the uncured epoxy compound continuous phase is formed.

4,707,530
POLYMERIZATION CATALYST

Burnett H. Johnson, Baytown, Tex., assignor to Exxon Research & Engineering Co., Florham Park, N.J.

Division of Ser. No. 461,602, Jan. 31, 1983, Pat. No. 4,451,574, which is a continuation-in-part of Ser. No. 307,134, Sep. 30, 1981, abandoned. This application Apr. 26, 1984, Ser. No. 591,634
Int. Cl.[4] C08F *4/02, 10/02*
U.S. Cl. 526—129 14 Claims

1. A process for polymerizing ethylene which comprises polymerizing ethylene, a mixture of ethylene and other alpha-olefins, or a mixture of ethylene, other alpha-olefins and/or diolefins in the presence of a catalyst system comprising a catalyst component (I) obtained by contacting silica in an inert solvent, (A) at least one organomagnesium compound, (B) at least one titanium compound represented by the formula $TiX'_{4-q}(OR')_q$ wherein X' is halogen, R' is a hydrocarbyl or substituted hydrocarbyl group having from 1–20 carbon atoms, and q is 0 or a number equal to or less than 4 wherein the titanium content is in the range of about 0.02 to about 3 mmols per gram of said silica, and at any state of the contacting, (C) a sufficient amount of chlorine such that after said silica is contacted with said organomagnesium compound and the titanium compound, chlorine is available so that the activity of the catalyst is increased, and (II) an organoaluminum compound of the formula $AlR''_nX''_{3-n}$ wherein R'' is hydrogen, hydrocarbyl or substituted hydrocarbyl group having 1 to 20 carbon atoms, X is a halogen and n is a number from 1 to 3; and recovering ethylene polymer of higher bulk density than when chlorine is not available.

4,707,531
METHOD FOR PRODUCING ORGANOSILICON POLYMERS AND THE POLYMERS PREPARED THEREBY

Akihiko Shirahata, Chiba, Japan, assignor to Toray Silicone Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 831,235, Feb. 18, 1986, abandoned. This application Oct. 22, 1986, Ser. No. 921,976
Claims priority, application Japan, Feb. 22, 1985, 60-35146
Int. Cl.[4] C08G *77/06*
U.S. Cl. 528—12 27 Claims

1. A method for producing organosilicon polymer having a general average formula

$$(R^1R^2R^3SiO_{\frac{1}{2}})_a(SiO_{4/2})_b$$

in which each R^1, R^2, and R^3 is a hydrogen atom or a monovalent hydrocarbon radical and the ratio of a/b is from 0.2/1 to about 4/1 comprising dripping an alkyl silicate selected from the group consisting of alkyl orthosilicate and its partial hydrolysis condensate into a mixture of aqueous hydrochloric acid containing at least 5 weight percent hydrogen chloride and an organosilicon compound selected from the group consisting of a disiloxane of the formula

$$(R^1R^2R^3Si)_2O,$$

an organosilane of the formula

$$R^1R^2R^3SiX,$$

and mixtures thereof in which R^1, R^2, and R^3 are defined above and X is a group selected from the group consisting of a halogen atom, an alkoxy group, and a hydroxyl group at a temperature of from 0° to 90° C. with stirring.

4,707,532

COPOLYMERIZATION OF BLOCKED POLYISOCYANATES WITH BICYCLIC AMIDE ACETALS

Anil B. Goel, Worthington, Ohio, assignor to Ashland Oil, Inc., Ashland, Ky.

Filed Apr. 27, 1987, Ser. No. 42,915
Int. Cl.[4] C08G *18/81*
U.S. Cl. 528—45 **7 Claims**

1. The process comprising copolymerizing a mixture comprising a bicyclic amide acetal and a blocked polyisocyanate at a temperature in the range of from about room temperature to about 200° C.

4,707,533

VINYL ESTER OF POLYEPOXIDE OF POLYPHENOL CYANATE MIXTURE AND POLYMALEIMIDE CO-OLIGOMER

Robert E. Hefner, Jr., Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 831,958, Feb. 24, 1986, Pat. No. 4,661,553.
This application Dec. 8, 1986, Ser. No. 939,384
Int. Cl.[4] C08G *59/02*
U.S. Cl. 528—96 **13 Claims**

1. A vinyl ester resin composition prepared by reacting

(A) at least one polyepoxide of a co-oligomerization product of a mixed cyanate of a polyphenol and a polymaleimide; with

(B) from about 0.75 to about 1.2 moles of at least one monounsaturated monocarboxylic acid; in the presence of

(C) a catalytic quantity of a suitable catalyst for effecting a reaction between components (A) and (B).

4,707,534

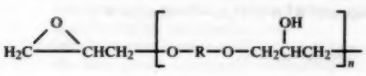
GLYCIDYLETHERS OF FLUORENE-CONTAINING BISPHENOLS

William J. Schultz, Vadnais Heights, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Dec. 9, 1986, Ser. No. 939,574
Int. Cl.[4] C08G *59/24*
U.S. Cl. 528—97 **14 Claims**

1. Glycidyl ethers of ortho-substituted-4-hydroxyphenylfluorenes.

2. Glycidyl ethers of claim 1 having the formula



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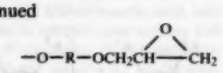
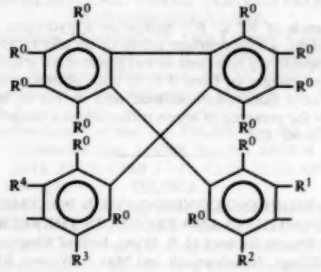


wherein n is a number having a value of 0 to 3, and R is divalent organic group having the formula



in which

each R^0 is independently selected from hydrogen and groups that are inert in the polymerization of epoxide group-containing compounds, and

each of R^1, R^2, R^3, and R^4 is independently selected from hydrogen, linear and branched alkyl groups having 1 to 6 carbon atoms, phenyl and halogen;

with the privisos that at least one of R^1, R^2, R^3, and R^4 is a linear or branched alkyl group having 1 to 6 carbon atoms, a phenyl group, or halogen and the epoxy equivalent weight of the diglycidyl ether is at most about 500.

4,707,535

LOW VISCOSITY ADDUCTS OF A POLY(ACTIVE HYDROGEN) ORGANIC COMPOUND AND POLYEPOXIDE

Joseph V. Koleske, Charleston, W. Va., assignor to Union Carbide Corporation, Danbury, Conn.

Filed Oct. 27, 1983, Ser. No. 546,114
The portion of the term of this patent subsequent to Dec. 16, 2003, has been disclaimed.
Int. Cl.[4] C08G *59/00, 59/68, 65/04, 59/40*
U.S. Cl. 528—110 **39 Claims**

1. An adduct of a poly(active hydrogen) organic compound and a polyepoxide comprising the reaction product of a poly(active hydrogen) organic compound and a polyepoxide containing two or more epoxy groups per molecule in a molar ratio of poly(active hydrogen) organic compound to polyepoxide of about 2:1 to about 3:1, said adduct having an oxirane content of less than about 0.05 percent and a viscosity of less than about 3500 centistokes at 54.5° C.

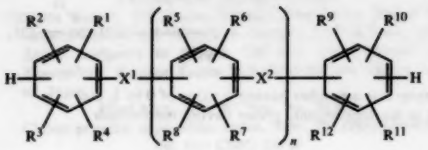
4,707,536

CATALYTIC PREPARATION OF AROMATIC POLYKETONE FROM PHOSGENE AND AROMATIC ETHER OR SULFIDE

Norihiko Yoneda; Tsuyoshi Fukuhara, both of Sapporo, and Seiichi Nozawa, Yamato, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

Filed Dec. 5, 1985, Ser. No. 804,615
Claims priority, application Japan, Dec. 11, 1984, 59-261531; Mar. 28, 1985, 60-64287
Int. Cl.[4] C08G *65/00, 83/00*
U.S. Cl. 528—198 **10 Claims**

1. A process for producing aromatic polyketone, comprising reacting a compound represented by the formula (I):



(I)

wherein each of R^1 to R^{12} represents a hydrogen atom, a halogen atom, a hydrocarbon group or an alkoxy group; X^1 and X^2 respectively represent an oxygen atom or a sulfur atom and n is an integer of from 0 to 5, with phosgene (i) in the presence of a fluoroalkanesulfonic acid or (ii) in hydrogen fluoride in the presence of boron trifluoride at a temperature of from 65° to 90° C.

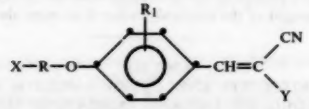
4,707,537

UV-ABSORBING CONDENSATION POLYMERIC COMPOSITIONS AND PRODUCTS THEREFROM

Wayne P. Pruett; Richard H. S. Wang, both of Kingsport; Samuel D. Hilbert, Jonesborough, and Max A. Weaver, Kingsport, all of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 30, 1986, Ser. No. 913,204
Int. Cl.[4] C08G *63/44, 69/44*
U.S. Cl. 528—288 **7 Claims**

1. A polyester composition having a maximum light absorbance within the range of from about 320 nm to about 380 nm and having reacted therein a total of from about 1.0 to about 5,000 parts by weight per million parts by weight of polyester of at least one UV-absorbing compound of the formula



wherein X is hydroxyl, carboxy, carbalkoxy, substituted carbalkoxy, or acyloxy; Y is cyano, carbamyl, substituted carbamyl, aryl, acyl, alkylsulfonyl, substituted alkylsulfonyl, phenylsulfonyl, or substituted phenylsulfonyl; R is selected from -alkylene-O-alkylene-, -alkylene-S-alkylene-, -alkylene-N(-SO_2alkyl)-alkylene-, straight or branched chain alkylene or such alkylene substituted with an X substituent; and R_1 is hydrogen or 1–3 groups selected from alkyl, alkoxy and halogen.

4,707,538

POLYAMIDE PREPARATION WITH PENTAAMINE COBALT (III) COMPLEX CATALYST

Mu-Yen M. Wu, Cuyahoga Falls; Lawrence E. Ball, Akron, and Gerald P. Coffey, Lyndhurst, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Continuation-in-part of Ser. No. 336,545, Jan. 4, 1982, abandoned. This application Dec. 15, 1983, Ser. No. 561,709
Int. Cl.[4] C08G *69/08*
U.S. Cl. 528—315 **8 Claims**

1. A process for preparing a polyamide containing a plurality of

amide groups as integral parts of the main polymer chain comprising polymerizing a polyamide forming system, chosen from (1) an alpha, beta-unsaturated carboxylic acid and ammonia, (2) an ammonium salt of an alpha, beta unsaturated carboxylic acid, (3) an alpha, beta-unsaturated nitrile and water, (4) an alpha, beta-unsaturated amide and ammonia, (5) or a beta-amino propionic acid or its alkyl derivatives, in contact with a catalyst comprising a pentaamine cobalt (III) complex.

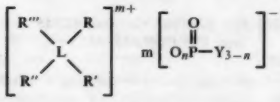
4,707,539

PROCESS FOR THE PREPARATION OF THERMOSETTING ALIPHATIC POLYCARBONATE WITH QUATERNARY SALT CATALYST

Peter Mues, Duisburg; Dimitrios Kerimis, Cologne; Hanns P. Müller, Odenthal, and Hans-Josef Buysch, Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Fed. Rep. of Germany

Filed Jun. 18, 1986, Ser. No. 875,602
Claims priority, application Fed. Rep. of Germany, Jun. 29, 1985, 3523399
Int. Cl.[4] C08G *63/62*
U.S. Cl. 528—371 **4 Claims**

1. A process for the production of a thermosetting, unreinforced or reinforced aliphatic polycarbonate by ring-opening copolymerization comprising copolymerizing monocyclic carbonate(s) and bifunctional cyclic carbonate(s) having a cross-linking action, in which a quaternary salt of the general formula



(I)

wherein

L represents nitrogen or phosphorus,

R represents a hydrogen atom or a C_1–C_6-alkyl, C_6–C_{10}-cycloalkyl or C_6–C_{10}-aryl group,

R′, R″ and R‴ independently have the meanings given for R, or at least two of these radicals together form a heterocyclic radical containing 5–10 carbon atoms, and in which L is part of the ring,

Y represents equal or different C_1–C_6-alkoxy, C_1–C_6-thioalkyl, C_1–C_6-alkyl, aryl or aryloxy groups,

n is 1 or 2, and

m is 1 or 2

is applied as a catalyst.

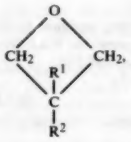
4,707,540

NITRAMINE OXETANES AND POLYETHERS FORMED THEREFROM

Gerald E. Manser, Folsom, and Richard W. Fletcher, Fair Oaks, both of Calif., assignors to Morton Thiokol, Inc., Chicago, Ill.

Filed Oct. 29, 1986, Ser. No. 825,658
Int. Cl.[4] C08G *65/22*
U.S. Cl. 528—417 **8 Claims**

1. A nitramine oxetane having the formula:



wherein at least one of R^1 and R^2 have the formula $(CH_2)_4$—$N(NO)_2$—A, wherein n is at least 1 and A is —H or an alkyl group, and R^2 is $(CH_2)_n$—Y wherein Y is

—H, alkyl, —$N(NO_2)$—A, —N_3,

-continued

—CN, —O—alkyl or —O—C(=O)—A.

4,707,541

SYNTHESIS OF HGRF (SOMATOCRININ) IN LIQUID PHASE AND INTERMEDIATE PEPTIDES

Joseph Diaz, Perols; Henri Demarne, Montpellier; Roméo Roncucci, and Paul-Henry Schmelck, both of Paris, all of France, assignors to Sanofi, Paris, France

Filed Jul. 8, 1985, Ser. No. 752,799

Claims priority, application France, Jul. 10, 1984, 84 10965

The portion of the term of this patent subsequent to Apr. 8, 2003, has been disclaimed.

Int. Cl.[4] C07K *7/10*

U.S. Cl. 530—324 **4 Claims**

1. A process for the synthesis, in liquid phase and by fragments , of hGRF 1–44 and hGRF 1–40, wherein said process consists in coupling, one after the other and in the order of the sequence of the GRF,

(1) on the one hand, the following fragments :

H—Ala—Arg—Ala—Arg—Leu—NH_2	called Fragment A	hGRF (40–44) or alaninamide
H—Gln—Glu—Arg—Gly—OH	called Fragment B'_1	hGRF (36–39)
H—Glu—Ser—Asn—OH	called Fragment B'_2	hGRF (33–35)
H—Ser—Arg—Gln—Gln—Gly—OH	called Fragment C	hGRF (28–32)
H—Leu—Gln—Asp—Ile—Met—OH	called Fragment D'	hGRF (23–27)
H—Arg—Lys—Leu—OH	called Fragment E'_1	hGRF (20–22)

to obtain the peptide K[hpGRF (20–44] or the corresponding peptide having the sequence (20–40) and

(2) on the other hand, the following fragments :

H—Gln—Leu—Ser—Ala	called Fragment F_1	hGRF (16–19)
H—Tyr—Arg—Lys—Val—Leu—Gly OH	called Fragment G_1	hGRF (10–15)
H—Ile—Phe—Thr—Asn—Ser—OH	called Fragment H_1	hGRF (5–9)

to obtain the peptide J [hGRF (5–19)] and thereafter to couple together the peptides J and K_1 in order to form the peptide having the sequence hGRF (5–44) or hGRF (5–40) and finally to couple the resulting peptide with the peptide H-Tyr-Ala-Asp-Ala-OH, called fragment I hGRF (1–4) and process wherein, in addition, in said fragments :

(a) the side acid functions of the aspartic and glutamic acids and the side amine function of the lysine are protected by protector groups stable in the conditions of deprotection of the group Boc, tertiobutyloxycarbonyl);

(b) the guanidine function of the arginine in position 20 is protected by the MTS group (2,4,6-trimethyl phenylsulfonyl) and the guanidine function of the other arginines is protected by protonation; and

(c) the N-terminal amino acid is protected on the amine by the Boc group, selectively eliminating the group Boc from the N-terminal amine of the peptide in phase of elongation by hydrolysis with trifluoroacetic acid, said coupling being effected in an aprotic polar solvent and eliminating, at the end of sequence, all the protector groups by hydrolysis with the aid of a 0.1 to 1M solution of methanesulfonic or trifluoromethanesulfonic acid in trifluoroacetic acid.

4,707,542

IMMUNOGENIC HBSAG DERIVED FROM TRANSFORMED YEAST

Arthur Friedman, Churchville; E. Dale Lehman, Lansdale; William J. McAleer, Ambler; Ted F. Schaefer, Collegeville; Edward M. Scolnick, Wynnewood, and D. Eugene Wampler, Harleysville, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 525,345, Aug. 22, 1983. This application Aug. 1, 1984, Ser. No. 636,514

Int. Cl.[4] A61K *39/29;* **C08B** *37/12;* **C12N** *15/00;* **C07K** *3/20*

U.S. Cl. 530—371 **2 Claims**

1. A method of removing pyrogenic substances and yeast protein from HBsAg produced in yeast cells which comprises passing the HBsAg across a hydrophobic substrate formed by bonding butylamine to agarose by a preponderance of N-substituted carbamate bonds, for a time and under conditions sufficient to adsorb the HBsAg to said substrate.

4,707,543

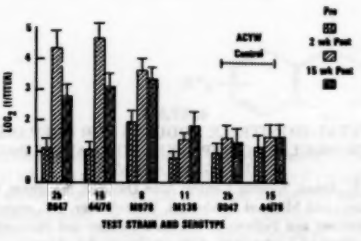
PROCESS FOR THE PREPARATION OF DETOXIFIED POLYSACCHARIDE-OUTER MEMBRANE PROTEIN COMPLEXES, AND THEIR USE AS ANTIBACTERIAL VACCINES

Wendell D. Zollinger, Silver Spring; John Boslego, Rockville; Ellen Moran, Wheaton; Brenda Brandt, Gaithersbourg; Hugh Collins, Largo, all of Md.; Robert Mandrell, Novato, Calif.; Patricia Altieri, and Sanford Berman, both of Silver Spring, Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 17, 1985, Ser. No. 777,068

Int. Cl.[4] C07K *3/24, 15/04*

U.S. Cl. 530—402 **33 Claims**



1. A process for preparing an immunogenic detoxified polysaccharide-outer membrane protein complex from bacteria wherein said complex is essentially free of toxic polysaccharide comprising the steps of:

a. suspending the outer membrane proteins in a TEEN buffer solution containing 1% of the zwitterionic detergent Empigen BB, 0.01M ethylenediaminetetraacetic acid, 0.05M tris-HCl, and 0.15M NaCl, said solution having a pH of about 8.0;

b. stirring the suspension formed in step a. for about 1 hour at about room temperature followed by mild sonication;

c. centrifuging the suspension formed in step b. at about 20,000×g for about 15 minutes and separating the supernatant fluid from the insoluble residue;

d. adding solid ammonium sulfate to the supernatant layer

formed in step c. in an amount of 500 grams/liter of supernatant protein solution and stirred until the ammonium sulfate is dissolved, and then allowed to stand at about room temperature for about 1 to 2 hours to allow precipitation of the outer membrane protein;

e. centrifuging the product of step d. at about 20,000×g for about 20 minutes and collecting the precipitated outer membrane proteins which form a top layer;

f. dissolving the precipitated outer membrane proteins formed in step e. in a buffer solution of the type described in step a., adding ammonium sulfate, and separating the precipitate;

g. repeating the process of step f.;

h. dissolving the precipitate formed in step g. in a TEEN buffer to form a solution, then dialyzing said solution against TEEN buffer to remove $(NH_4)_2SO_4$;

i. centrifuging the solution formed in step h. at about 35,000×g for about 20 minutes and removing any insoluble material;

j. filtering the centrifuged solution formed in step i. sequentially through 1.2μ, 0.45 μ, and 0.22μ membrane filters;

k. sterile filtering the solution formed in step j. through a 0.22μ membrane filter;

l. complexing the sterilized outer membrane proteins with a sterile filtered polysaccharide by combining the outer membrane protein, derived from one or more strains, and polysaccharide, derived from one or more strains, in a ratio within the range of 1:2 to 2:1 in TEEN buffer and coprecipitating by the cold, sterile absolute ethanol to 75% volume/volume;

m. centrifuging, under sterile conditions, the ethanolic solution formed in step l. at about 20,000×g for about 15 minutes and separating the precipitate; and

n. washing the precipitate formed in step m. with sterile absolute ethanol to remove essentially all components of the buffer solution yielding an immunogenic detoxified polysaccharide-protein complex.

4,707,544

METAL-ISONITRILE ADDUCTS FOR PREPARING RADIONUCLIDE COMPLEXES FOR LABELLING AND IMAGING AGENTS

Alun G. Jones, Newton Centre; Alan Davison, Needham, both of Mass., and Michael J. Abrams, Westchester, Pa., assignors to President and Fellows of Harvard College and Massachusetts Institute of Technology, both of Cambridge, Mass.

Filed Nov. 28, 1984, Ser. No. 675,540

Int. Cl.[4] A61K *43/00, 49/00;* **C07F** *1/08;* **C07C** *121/20*

U.S. Cl. 534—14 **55 Claims**

1. A method for preparing a coordination complex of an isonitrile ligand and a radioactive metal selected from the class consisting of radioactive isotopes of Tc, Ru, Co, Pt, Fe, Os, Ir, W, Re, Cr, Mo, Mn, Ni, Rh, Pd, Nb and Ta said method comprising preparing a soluble metal adduct of said isonitrile ligand by admixing said ligand with a salt of a displaceable metal having a complete d-electron shell selected from the class consisting of Zn, Ga, Cd, In, Sn, Hg, Tl, Pb and Bi to form a soluble metal-isonitrile salt, and admixing said metal isonitrile salt with a salt comprising said radioactive metal in a suitable solvent to displace said displaceable metal with the radioactive metal thereby forming said coordination complex.

4,707,545

PROCESS FOR THE PREPARATION OF LITHIUM SALTS OF ANIONIC DYES BY REACTING THE CALCIUM SALTS WITH LITHIUM SULFATE OR LITHIUM HYDROGEN SULFATE

Fritz Meininger, Frankfurt am Main, and Ludwig Schläfer, Kelkheim, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Nov. 26, 1985, Ser. No. 801,751

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1984, 3443305

Int. Cl.[4] C09B *43/00, 46/00, 62/00, 62/503*

U.S. Cl. 534—588 **18 Claims**

1. A process for preparing a lithium salt of an anionic dye, which comprises reacting a salt of this anionic dye present as a salt other than as the lithium salt, in aqueous solution or suspension with a compound which releases a calcium ion to form the water-insoluble or sparingly water-soluble calcium salt of that dye which is then separated from the aqueous medium and is then reacted in aqueous suspension with the equivalent amount of lithium sulfate or lithium hydrogensulfate or a mixture thereof, or in an excess of up to 10%, to convert it into its lithium salt.

4,707,546

REACTIVE MONOAZO DYESTUFFS

Toshio Niwa; Kiyoshi Himeno, and Toshio Hihara, all of Yokohama, Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

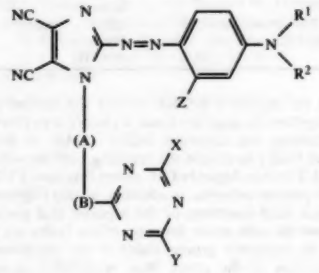
Continuation of Ser. No. 624,581, Jun. 26, 1984, abandoned. This application Jan. 23, 1986, Ser. No. 822,680

Claims priority, application Japan, Jul. 12, 1983, 58-126440

Int. Cl.[4] C09B *62/085*

U.S. Cl. 534—635 **3 Claims**

1. A reactive monoazo dyestuff of the following formula



wherein each of R^1 and R^2 represents lower alkyl, lower alkoxyalkyl or tetrahydrofurfurylalkyl, Z represents methyl or acylamino, (A) represents $—C_2H_4—$ or $—C_3H_6—$, (B) represents oxygen, X represents fluorine and Y represents $—NR^4R^5$ wherein each of R^4 and R^5 represents hydrogen, substituted or unsubstituted lower alkyl or aralkyl.

4,707,547
PROCESS FOR PREPARING CARBAPENEM COMPOUNDS

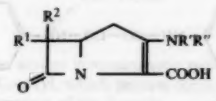
Burton G. Christensen, Scotch Plains, and Ronald W. Ratcliffe, Matawan, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 728,354, Apr. 29, 1985, abandoned, which is a division of Ser. No. 388,311, Jun. 14, 1982, Pat. No. 4,530,841, which is a continuation of Ser. No. 176,818, Aug. 8, 1980, abandoned, which is a continuation-in-part of Ser. No. 119,914, Feb. 8, 1980, abandoned, which is a continuation of Ser. No. 843,379, Oct. 19, 1977, abandoned. This application May 2, 1986, Ser. No. 859,281

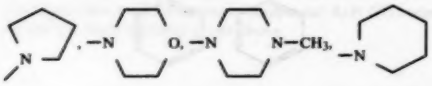
Int. Cl.⁴ C07D *487/04*; A61K *31/40*

U.S. Cl. 540—310 **1 Claim**

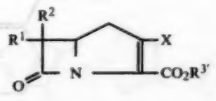
1. A process for preparing a compound:



and the pharmaceutically acceptable salts, thereof, wherein: R′ and R″ are independently selected from the group consisting of hydrogen, substituted with 1–3 substituents and unsubstituted: alkyl and cycloalkyl having 1–10 carbon atoms, phenylalkyl and heterocyclylalkyl wherein the alkyl moiety has 1–6 carbon atoms and the heterocyclyl is selected from:



wherein the ring or chain substituent or substituents on R′, R″, or the cyclic radical formed by their joinder are selected from amino, mono- or dialkylamino (each alkyl having 1–6 carbon atoms), hydroxyl, carboxyl, alkoxyl having 1–6 carbon atoms, chloro, bromo, fluoro, nitro, sulfamoyl, phenyl, benzyl and alkoxycarbonyl having 1–3 carbon atoms in the alkoxyl moiety; and R^1 and R^2 are independently selected from the group consisting of hydrogen, substituted and unsubstituted: alkyl, alkenyl, and alkynyl, having from 1–10 carbon atoms; cycloalkyl, cycloalkylalkyl, and alkylcycloalkyl, having 3–6 carbon atoms in the cycloalkyl ring and 1–6 carbon atoms in the alkyl moieties; phenyl; aralkyl, aralkenyl, and aralkynyl wherein the aryl moiety is phenyl and the alkyl chain has 1–6 carbon atoms; wherein the substituent or substituents relative to the above-named radicals are selected from the group consisting of: amino, mono- or di-alkylamino, hydroxyl, alkoxyl, mercapto, alkylthio, phenylthio, sulfamoyl, amidino, guanidino, nitro, chloro, bromo, fluoro, cyano and carboxy; and wherein the alkyl moieties of the above-recited substituents have 1–6 carbon atoms; when R^1/R^2 is hydrogen, R^2/R^1 is not 1-hydroxyethyl; comprising treating:



wherein X is a leaving group and $R^{3'}$ is a blocking group or pharmaceutically acceptable ester moiety with a primary or secondary amine: H_2NR' or $HNR'R''$, respectively, calculated to provide the 3-substituent, —NR′R″, in a solvent and at a temperature of from 0° to 50° C.

4,707,548
BISISOINDOLINE PIGMENTS

Wolfgang Lotsch, Beindersheim; Gustav Bock, Neustadt, and Peter Neumann, Wiesloch, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

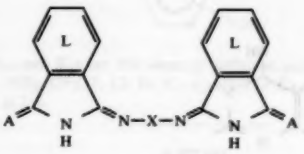
Filed Jan. 24, 1986, Ser. No. 821,972

Claims priority, application Fed. Rep. of Germany, Feb. 5, 1985, 3503776

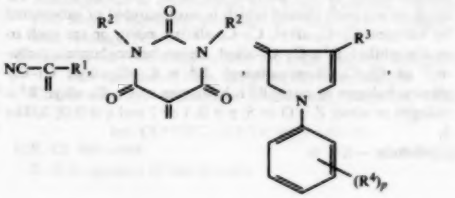
Int. Cl.⁴ C07D *403/14*

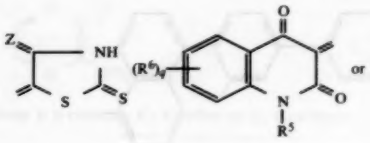
U.S. Cl. 544—284 **11 Claims**

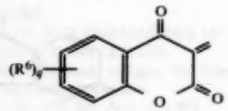
1. A bisisoindoline pigment of the formula:



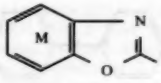
wherein A= is a methylene-active radical of the formula







the two radicals A being identical or different, and R^1 is cyano; carbamyl which is unsubstituted or substituted by C_1–C_6-alkyl, benzyl, naphthyl or phenyl, the three last mentioned radicals being unsubstituted or substituted by chlorine, bromine, C_1–C_6-alkyl, C_1–C_6-alkoxy, nitro, trifluoromethyl, C_1–C_6-alkylcarbonyl, cyano, C_1–C_6-alkylamino, benzoylamino, phthalimidyl, carbamyl or C_1–C_6-alkoxycarbonyl; C_1–C_6-alkylcarbonyl; benzoyl, C_1–C_6-alkoxycarbonyl, benzyloxycarbonyl or phenoxycarbonyl, where benzoyl, benzyl and phenoxy are unsubstituted or substituted by halogen, nitro, C_1–C_6-alkyl, C_2–C_7-alkanoylamino or phthalimidyl; phenyl which is unsubstituted or substituted by halogen, nitro, trifluoromethyl or cyano; or a heterocyclic radical of the formula



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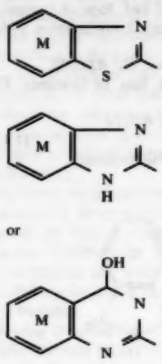
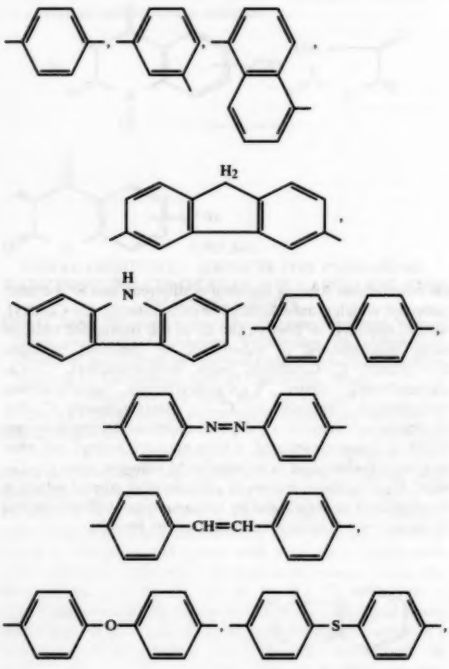


or

where the rings M are each unsubstituted or substituted by halogen, nitro, C_1–C_6-alkyl or C_1–C_6-alkoxy; the radicals R^2 independently of one another are each hydrogen or C_1–C_6-alkyl, or are each phenyl which is unsubstituted or substituted by halogen, C_1–C_6-alkyl, C_1–C_6-alkoxy, nitro, or are each α- or β-naphthyl; R^3 is C_1–C_6-alkyl, amino, benzoylamino, carbamyl or C_1–C_6-alkoxycarbonyl; R^4 is C_1–C_6-alkyl, C_1–C_6-alkoxy, halogen or nitro; R^5 is hydrogen or C_1–C_6-alkyl; R^6 is halogen or nitro; Z is O or S; p is 0, 1 or 2 and q is 0, 1, 2, 3 or 4,

wherein —X— is



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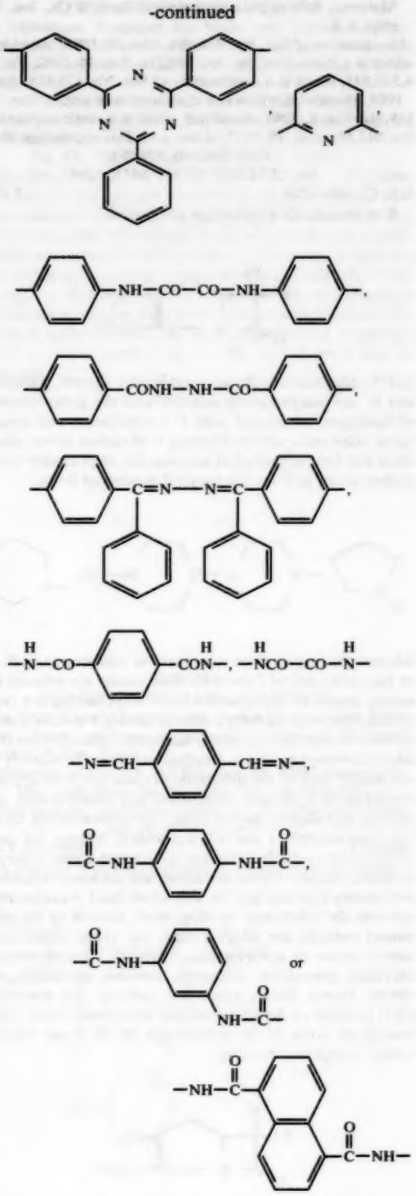


the benzene and naphthalene rings being unsubstituted or substituted by halogen, nitro, C_1–C_6-alkyl or C_1–C_6-alkoxy, and rings L are monosubstituted, disubstituted, trisubstituted or tetrasubstituted by halogen, C_1–C_6-alkyl, C_1–C_6-alkoxy, nitro or carbamyl.

4,707,549
PREPARATION OF ESTERS OF OPTICALLY ACTIVE 2-ARYLALKANOIC ACIDS

Gerhard Fritz, Dannstadt-Schauernheim; Manfred Eggersdorfer, Frankenthal, and Hardo Siegel, Speyer, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

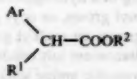
Filed Feb. 4, 1985, Ser. No. 697,846

Claims priority, application Fed. Rep. of Germany, Aug. 2, 1984, 3404336

Int. Cl.[4] C07C *69/76;* **C07D** *213/15, 241/12, 333/24*

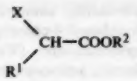
U.S. Cl. 544—336 **6 Claims**

1. A process for the preparation of an optically active 2-arylalkanoic acid ester of the formula



I

where Ar is an aryl or heteroaromatic radical and R^1 and R^2 are each C_1–C_4-alkyl, which process comprises subjecting an optically active ester of the formula



II

where X is chlorine, bromine or a radical Y—SO_2—O—, in which Y is chlorine or a hydrocarbon radical, to a Friedel-Crafts reaction with an aromatic compound ArH (III) where Ar has the same meaning given above.

4,707,550
N-(SUBSTITUTED THIENYL)-N'-(SUBSTITUTED PIPERAZINYL)-UREAS

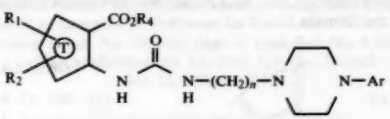
Jeffery B. Press, Rocky Hill, and Ronald K. Russell, Pennington, both of N.J., assignors to Ortho Pharmaceutical Corporation, Raritan, N.J.

Division of Ser. No. 856,558, Apr. 28, 1986, Pat. No. 4,670,560. This application Jan. 21, 1987, Ser. No. 5,545

Int. Cl.[4] C07D *409/12*

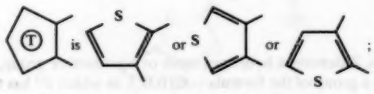
U.S. Cl. 544—379 **3 Claims**

1. A compound of the formula



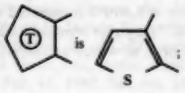
II

where



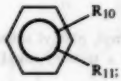
R_1 and R_2 are the same or different and are hydrogen, F, Cl, Br, nitro, C_1–C_3 alkyl or R_1 and R_2 together are —$(CH_2)_4$—

when



R_4 is C_1–C_2 alkyl;

Ar is



R_{10} and R_{11} are the same or different and are hydrogen, NO_2, CF_3, F, Cl, Br, C_1–C_3 alkyl or C_1–C_2 alkoxy; and n is 2–4.

4,707,551
PYRAZINYL SULFONAMIDES USEFUL AS INTERMEDIATES FOR HERBICIDES

Beat Böhner, Binningen; Werner Föry, Basel; Rolf Schurter, Binningen, all of Switzerland, and Georg Pissiotas, Lörrach, Fed. Rep. of Germany, assignors to CIBA-GEIGY Corporation, Ardsley, N.Y.

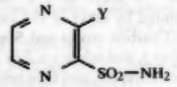
Division of Ser. No. 496,325, May 19, 1983, Pat. No. 4,612,037. This application Mar. 21, 1986, Ser. No. 842,618

Claims priority, application Switzerland, May 28, 1982, 3314/82

Int. Cl.[4] C07D *241/18;* **A01N** *47/36*

U.S. Cl. 544—408 **4 Claims**

1. A compound of the formula



wherein Y is chlorine, C_1–C_4 alkyl or C_1–C_4 alkoxy.

4,707,552
PREPARATION OF NITRILES AND THIOAMIDES OF FUSED RING PYRIDINE DERIVATIVES

Robin G. Shepherd, Maidenhead, England, assignor to John Wyeth & Brother Limited, Maidenhead, England

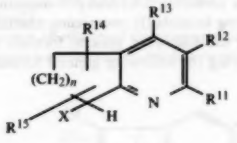
Continuation-in-part of Ser. No. 472,787, Mar. 7, 1983, abandoned. This application Sep. 18, 1985, Ser. No. 777,129

Claims priority, application United Kingdom, Mar. 11, 1982, 8207051

Int. Cl.[4] C07D *215/48, 221/04*

U.S. Cl. 546—176 **4 Claims**

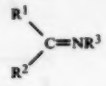
1. A process for preparing thioamides or nitriles of formula VI



(VI)

or acid addition salts thereof, wherein X is $CSNH_2$ or CN, R^{11}, R^{12}, R^{13}, R^{14}, R^{15} are the same or different and represent hydrogen, alkyl of 1–6 carbon atoms, cycloalkyl of 4–6 carbon atoms, phenylalkyl of 7–12 carbon atoms or phenyl groups, any of which groups may be mono or disubstituted by alkyl of

1–6 carbon atoms, alkoxy of 1–6 carbon atoms, fluorine or trifluoromethyl or R^{11} and r^{12} taken together, or R^{12} and R^{13} taken together, form a 5,6 or 7 membered saturated carbocyclic ring, R^{14} and R^{15} may also represent alkoxy of 1–6 carbon atoms and n is 1,2 or 3, in which a compound of formula II



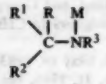
(II)

wherein

R^1 is hydrogen, phenyl, phenyl substituted by alkyl of 1–6 carbon atoms, or a tertiary alkyl group of 4–6 carbon atoms;

R^2 is phenyl, phenyl substituted by alkyl of 1–6 carbon atoms, or a tertiary alkyl group of 4–6 carbon atoms;

R^3 is a branched chain alkyl of 3–6 carbon atoms, is reacted with a metal alkyl MR where M is lithium, sodium or potassium and R is an alkyl group of 2–6 carbon atoms or a phenyl substituted by alkyl of 1–6 carbon atoms, in an inert non-polar solvent to obtain a compound of formula III



(III)

wherein R, R^1, R^2, R^3 and M are as defined above and compound III is reacted with a compound of formula VI as defined above wherein X is hydrogen to obtain a compound of formula VI, as defined above, wherein X is M and this is reacted with a silicon compound of formula $R_x{}^{16}Si(NCS)_{4-x}$ wherein R^{16} is alkyl of 1–6 carbon atoms, phenyl, phenyl substituted by alkyl of 1–6 carbon atoms, or phenylalkyl of 7–12 carbon atoms and S is sulphur and x has a value from 0 to 3, and when x is 2 or 3 the groups R^{16} may be the same or different, and then subjecting the product to hydrolysis or alcoholysis, with the proviso that when a compound of formula VI where X is CN is desired the molar ratio of the silicon compound to compound VI when X is M is at least 2:1 and x is 3.

4,707,553

INDOLE DERIVATIVES AND PROCESS FOR PRODUCING THE SAME

Masato Satomura, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

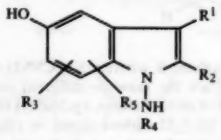
Filed Dec. 28, 1984, Ser. No. 687,328

Claims priority, application Japan, Dec. 28, 1983, 58-248910

Int. Cl.[4] C07D *401/12, 209/08*

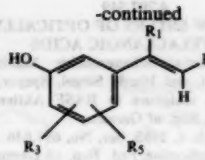
U.S. Cl. 546—273 **2 Claims**

1. A process for poducing 5-hydroxy-N-substituted indoles having the following formula (I) comprising reacting a phenol derivative having the following general formula (II) with a diazonium salt having the following general formula (III)

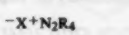


(I)

-continued



(II)



(III)

wherein R_1, R_2 are each selected from the group consisting of a hydrogen atom, an alkyl group, an aralkyl group, an aryl group and an alkoxy group, and R_3 and R_5 are each selected from the group consisting of a hydrogen atom, an alkyl group, a halogen atom, an alkenyl group, an acyl group having 2 to 4 carbon atoms, an aryl group, an aralkyl group and an alkoxy group, R_4 represents a diazonium salt residue which is a substituted or unsubstituted aromatic amine selected from the group consisting of aniline, anisidine, chloroanisidine, chloroaniline, phenetidine, dichloroaniline, toluidine, chlorotolunidine, nitroaniline, aminobenzoic acid, aminobenzenesulfonic acid, aminonaphtholsulfonic acid, aminonaphtholdisulfonic acid, α-aminonaphthalene, diaminobenzene, aminobenzothiazole, aminocoumarin, aminocarbazole, amino-methylnaphthylidin-2-ol, N-4-amino-2-methylphenyl-4-chlorophthalimide, N-(p-methoxyphenyl)-p-phenylenediamine (Variamine Blue B), amino-methoxybenzothiazole, aminomethoxypyridine, amino-methyl-benzothiazole, and aminosalycilic acid and ^-X is an anion.

4,707,554

METHOD OF OBTAINING DERIVATIVES OF 4β-/1′-ALKEN-1′-YL/-2ξ,5α-DIHYDROXY-3,3aβ-4,5,6,6aβ-HEXAHYDRO-2H-CYCLOPENTA(B)FURAN

Barbara Achmatowicz; Andrzej R. Daniewski, both of Burgaska; Stanislaw Marczak, Pulawska; Jacek Pankowski, Goscincowa, and Jerzy Wicha, Batorego, all of Poland, assignors to Polska Akadcmia Nauk-Instytut Chemii Organicznej, Warsaw, Poland

Filed Nov. 27, 1985, Ser. No. 802,702

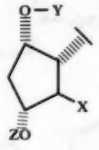
Claims priority, application Poland, Dec. 7, 1984, 250792; Dec. 7, 1984, 250794; Sep. 9, 1985, 255296

Int. Cl.[4] C07D *307/935*

U.S. Cl. 549—214 **9 Claims**

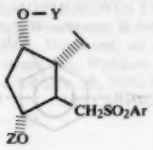
1. A method of obtaining derivatives of 4beta-1′-alken-1′-yl-2,5alpha-dihydroxy,3,3a beta-hexahydro-2H-cyclopenta[b]furan of the formula 3,

FORMULA 3



in which Z denotes a hydrogen atom or a protective group, Y denotes a group of the formula =CHOZ[1], in which Z^1 has the meaning stated for Z, whereby protective groups Z and Z^1 may be the same or different, and X denotes a straight or branched alkenyl chain corresponding to a side chain ω of prostaglandins or their analogs, comprising reacting a sulphonyl derivative of the formula 4,

FORMULA 4

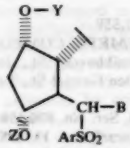


in which Y and Z have the above stated meaning and Ar denotes an aryl group, with a strongly basic organometallic compound and a metal salt selected from the group consisting of zinc, titanium, magnesium and boron halides and then with an electrophilic agent of the formula 5,

FORMULA 5

in which one of R^1 and R^2 denotes a hydrogen atom and the other one denotes a straight or branched alkyl group or the other one of R^1 and R^2 denotes an aryl group, or in which R^1 and R^2 denote the same or different alkyl, and thereafter the obtained intermediate compound of the formula 6,

FORMULA 6



in which Y and Z have the above stated meaning, and B denotes a group of the formula 7,

FORMULA 7

in which Ar, R^1 and R^2 have the above stated meaning, is reduced.

4,707,555

PROSTAGLANDIN INTERMEDIATES

David L. Coffen, Glen Ridge; George W. Holland; Perry Rosen, both of North Caldwell, and Frederick Wong, Glen Ridge, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

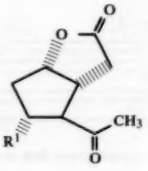
Division of Ser. No. 586,586, Mar. 6, 1984, Pat. No. 4,558,140. This application Jul. 12, 1985, Ser. No. 754,101

Int. Cl.[4] C07D *307/93*

U.S. Cl. 549—311 **2 Claims**

1. An optically active compound of the formula:

V



wherein R^1 is hydrogen or lower alkyl; and its racemate.

4,707,556

BOREON NITRIDE POLYMERIC PRECURSORS

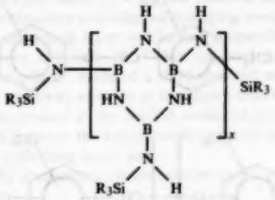
Kazimiera J. L. Paciorek, Corona del Mar; Reinhold H. Kratzer, Irvine; David H. Harris, Sierra Madre, and Wilfried Krone-Schmidt, Whittier, all of Calif., assignors to Ultrasystems Defense and Space, Inc., Irvine, Calif.

Filed Feb. 13, 1987, Ser. No. 14,700

Int. Cl.[4] C07F *7/02, 7/10*

U.S. Cl. 556—403 **4 Claims**

1. The polymer



where R is methyl, ethyl propyl, or butyl of the general formula C_nH_{2n+1} and where x is a positive integer.

4,707,557

1,1-DICHLORO-1,2,2-TRIMETHYL-2-PHENYLDISILANE AND METHOD FOR PRODUCING THE SAME

Yoichiro Nagai, Yamato; Hamao Watanabe, and Yoshinori Akutsu, both of Kiryu, all of Japan, assignors to Yuki Gosei Kogyo Co., Ltd., Tokyo, Japan

Filed Feb. 6, 1987, Ser. No. 11,804

Claims priority, application Japan, Feb. 19, 1986, 61-32807

Int. Cl.[4] C07F *7/08*

U.S. Cl. 556—430 **13 Claims**

1. 1,1-dichloro-1,2,2-trimethyl-2-phenyldisilane expressed by the chemical formula (I),

$$(C_6H_5)(CH_3)_2SiSi(CH_3)Cl_2.$$

4,707,558

MONOMERS AND OLIGOMERS CONTAINING A PLURALITY OF VINYLBENZYL ETHER GROUPS, METHOD FOR THEIR PREPARATION AND CURED PRODUCTS THEREFROM

Chun S. Wang; Zeng-kun Liao, both of Lake Jackson, and Dennis L. Steele, Freeport, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

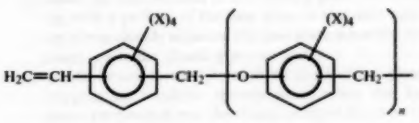
Filed Sep. 3, 1986, Ser. No. 903,165

Int. Cl.[4] C07C *149/12*

U.S. Cl. 568—23 **18 Claims**

1. A monomer of oligomer containing a plurality of vinylaryl ether groups represented by the following formulas I, II or III

(I)



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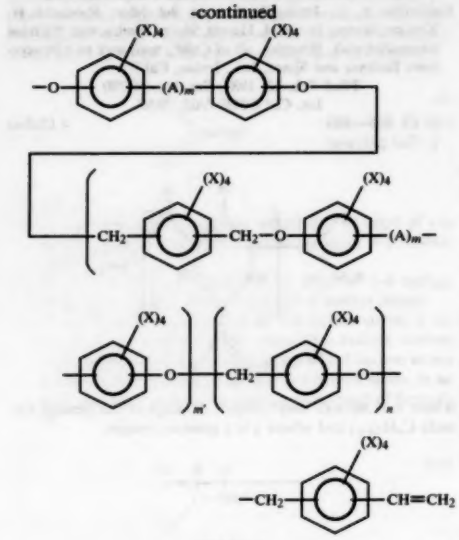
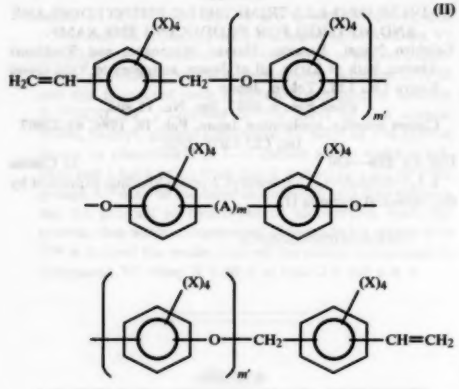
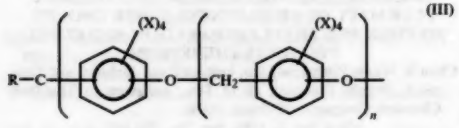


(II)



(III)



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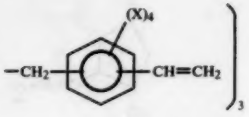
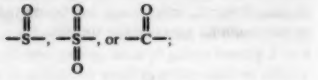


wherein A is a hydrocarbyl group having from 1 to about 25 carbon atoms, —O—, —S—, —S—S—,



R is hydrogen or a hydrocarbyl group having from 1 to about 12 carbon atoms; each X is independently hydrogen, a hydrocarbyl or hydrocarbyloxy group having from 1 to about 12 carbon atoms or a halogen atom; m' has a value of from zero to about 200; each m and n independently has a value of zero or one; with the proviso that when m' and n have a value of zero, then A is a dicyclopentadienyl group or a dicyclopentadienyl oligomer group.

4,707,559

ANALGETIC AND ANTIEMETIC COMPOSITIONS

Raphael Mechoulam, 12 Tchernikhovsky St., Jerusalem, and Jeffery J. Feigenbaum, 7/2 Ben Gavriel St., Talpiot, Jerusalem, both of Israel

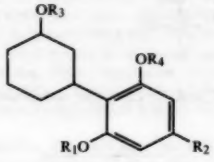
Filed Jun. 3, 1986, Ser. No. 870,154

Claims priority, application Israel, Jun. 11, 1985, 75480

Int. Cl.[4] **C07C** *43/21;* **A61K** *31/085*

U.S. Cl. 568—644 **12 Claims**

1. A 3- 6-(alkoxy)-4-(alkyl)-2-hydroxy phenyl -cyclohexanol derivative of the general formula



wherein R_1 designates straight or branched alkyl of up to and including 5 carbon atoms,

R_2 designates alkyl of 5 to 12 carbon atoms,

R_3 and R_4, which may be identical or different, each designates hydrogen an easily cleavable group giving a hydroxy group and

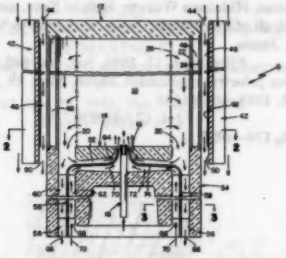
wherein the cyclohexyl moiety can be further substituted by non-interfering substituents.

4,707,560

THERMOPHOTOVOLTAIC TECHNOLOGY

Hoyt C. Hottel, Winchester; Robert E. Nelson, Weston, and C. Robert Parent, Westwood, all of Mass., assignors to TPV Energy Systems, Inc., Waltham, Mass.

Filed Dec. 19, 1986, Ser. No. 944,419
Int. Cl.[4] H02N 6/00
U.S. Cl. 136—253 62 Claims



1. A thermophotovoltaic generator system comprising

structure defining a combustion chamber that has an inlet and an outlet,

burner structure coupled to the inlet of said combustion chamber including first means for supplying fuel to said burner structure and second means spaced from said first means for supplying oxidant to said burner structure,

emitter structure disposed in said combustion chamber for thermal excitation by combustion products from said burner structure,

a photocell array outside said combustion chamber and in optically coupled relation to said emitter structure for producing electrical energy in response to radiation from said emitter structure, and

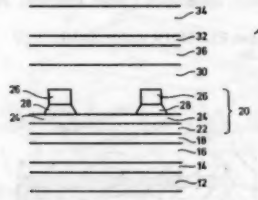
third means for flowing a portion of the combustion product stream directly from the outlet of said combustion chamber to the inlet of said combustion chamber for diluting the oxidant-fuel mixture and limiting the flame temperature to a safe range as a function of the thermal stability of a component of the thermophotovoltaic generator system.

4,707,561

PHOTOVOLTAIC CELL AND METHOD FOR ITS FABRICATION

Gert Hewig, Alzenau; Bernd Schurich, Bruchkoebel; Jörg Wörner, Grosskrotzenburg, and Hans-Werner Schock, Stuttgart, all of Fed. Rep. of Germany, assignors to Nukem GmbH, Hanau, Fed. Rep. of Germany

Continuation of Ser. No. 638,520, Aug. 7, 1984, abandoned. This application Aug. 8, 1986, Ser. No. 894,713
Claims priority, application Fed. Rep. of Germany, Aug. 10, 1983, 3328869
Int. Cl.[4] H01L 31/06, 31/18
U.S. Cl. 136—256 21 Claims



1. A photovoltaic cell comprising:

a substrate;

a first electrical contact deposited on the substrate;

a first semiconductor layer deposited on said first electrical contact and a second semiconductor layer, of opposite type of conductivity to that of said first semiconductor layer, deposited on said first layer;

a second electrical contact connected to the second semiconductor layer, said second electrical contact including three layers, composed of different materials, said three layers including (a) a current collecting layer made of a first material and having a grid-like structure, having a specific resistivity equal to or less than 10^{-2} for collecting charges from the second semiconductor layer, (b) a current bus layer made of a second material and having a grid-like structure in unaligned overlying contact with the current collecting layer and having a specific resistivity equal to or less than 10^{-4} ohm cm, and (c) a contact connecting layer, made of a third material and having a specific resistivity equal to or less than 1 ohm cm, forming an ohmic contact to the second semiconductor layer and disposed between the second semiconductor layer and the current collecting layer; and

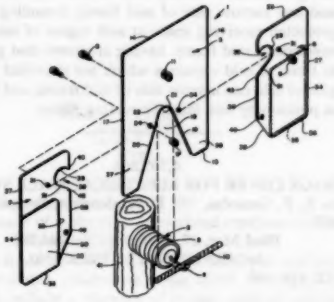
an optically transparent element covering the cell.

4,707,562

HIGH VOLTAGE PROTECTION BARRIER

Gary L. Whited, P.O. Box 99, 99 Community Rd., Kirkersville, Ohio 43033

Filed Oct. 24, 1986, Ser. No. 922,568
Int. Cl.[4] H02G 1/02
U.S. Cl. 174—5 R 20 Claims



19. A high voltage protection barrier adapted to be mounted on an insulator of an electric power line including:

a. an elongated generally flat base plate formed of a dielectric material;

b. slot means formed in the base plate for slidably receiving an insulator therein for suspending said base plate on the insulator;

c. a pair of locking plates formed of a dielectric material pivotally mounted on the base plate on opposite sides of the slot means and movable between open and closed positions;

d. means formed on each of the locking plates for cooperating with a portion of the base plate to maintain said locking plates closely adjacent the base plate when the locking plates are in the closed position; and

e. notch means formed in each of the locking plates for trapping an insulator therebetween when the locking plates are pivoted into the closed position about an insulator for locking the barrier on the insulator.

4,707,563

COMPONENT HOUSING FOR ELECTRICAL AND ELECTRONIC CIRCUITS

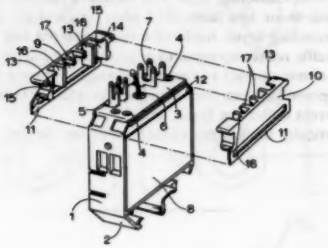
Horst Conrad; Konrad Tobergte, and Rainer Schulze, all of Detmold, Fed. Rep. of Germany, assignors to C. A. Weidmüller GmbH & Co., Detmold, Fed. Rep. of Germany

Filed Oct. 23, 1986, Ser. No. 922,153

Claims priority, application European Pat. Off., Nov. 8, 1985, 85114260.4

Int. Cl.[4] H05K *5/00*

U.S. Cl. 174—50 **12 Claims**



1. A component housing for electrical and electronic circuits and components, comprising

a frame constituting respective narrow sides of the housing at least one of which has a plurality of openings having different configurations;

two lateral covering plates arrestingly connected to said frame; and

a contact protection housing portion of an electrically insulating material extending over at least a partial region of said one narrow side of said frame, bounding a contact protected receiving space at said region of said one narrow side of said frame, having apertures that give access to those of said openings which are provided in said region of said one narrow side of said frame, and being held in position by said lateral covering plates.

4,707,564

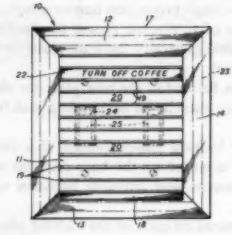
MESSAGE COVER FOR ELECTRICAL WALL SWITCHES

Arturo E. F. Gonzales, 759 E. Washington, Brownsville, Tex. 78520

Filed Mar. 27, 1986, Ser. No. 844,506

Int. Cl.[4] H02G *3/14;* **H05K** *5/03*

U.S. Cl. 174—66 **12 Claims**



1. A message bearing cover for attachment to interior electrical wall switches comprising;

a cavitated cover adapted to be releasably attached to an existing interior electrical wall switch installation at a convenient location for visibility within a dwelling and movable from a closed position enclosing the wall switch lever to an open position allowing access to the wall switch lever, and

the outer surface of said cavitated cover configured to removably receive and visually display selective printed messages when said cover is in the closed position.

4,707,565

SUBSTRATE FOR PRINTED CIRCUIT

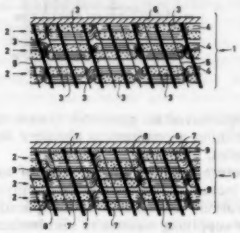
Shin Kasai; Hideharu Waketa; Keiichi Kato, and Yutaka Kawaguchi, all of Fukushima, Japan, assignors to Nitto Boseki Co., Ltd., Japan

Filed Mar. 17, 1986, Ser. No. 840,149

Claims priority, application Japan, Mar. 19, 1985, 60-55550; Oct. 31, 1985, 60-244444

Int. Cl.[4] H05K *1/00*

U.S. Cl. 174—68.5 **7 Claims**



1. A substrate for a printed circuit, in which a metal foil is mounted onto at least one of the outermost surfaces of a laminate made of a plurality of glass fiber woven fabrics comprised of warps and wefts impregnated with synthetic resin, and heated and pressed wherein said warps and wefts are in the form of threads comprised of a plurality of filaments, the filaments of said glass fiber woven fabrics being open, such that said synthetic resin fills gaps among the opened said filaments so that the said laminated glass fiber woven fabrics including the opened filaments are integrally joined with each other.

3. A multilayer printed circuit substrate, in which a plurality of glass cloth prepregs impregnated with synthetic resin are laminated; metal foil is mounted onto the outermost surfaces thereof; and the laminate is heated and pressed, wherein warps and wefts of said glass cloths are in the form of threads comprised of a plurality of filaments, the filaments being opened, such that said synthetic resin enters gaps among the opened filaments to thereby integrally join and laminate said glass cloth prepregs to each other.

4,707,566

ELECTRICAL CRIMP CONNECTION

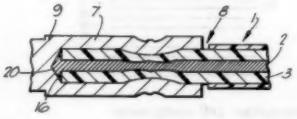
Ian R. A. Titcombe, Swindon, and Ian A. Strange, Bristol, both of England, assignors to Raychem Limited, Swindon, England

Filed Jul. 15, 1986, Ser. No. 885,999

Claims priority, application United Kingdom, Jul. 18, 1985, 8518141

Int. Cl.[4] H01R *4/10;* **H02G** *15/02*

U.S. Cl. 174—78 **21 Claims**



1. An electrical connection to an insulated wire having a conductor that is softer than the wire insulation, comprising:

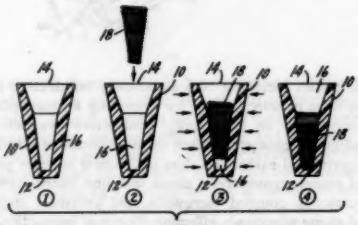
an electrically conductive connection element;
a crimping element located around a circumference of the wire and crimped thereon, the crimping element having been deformed to such an extent that it does not penetrate the insulation and has caused the conductor to exude from a position electrically isolated from the connection element to a position in electrical contact with the connection element.

4,707,567

SCREW-ON ELECTRICAL CONNECTOR AND METHOD OF MAKING IT

William E. Blaha, Elgin, Ill., assignor to Ideal Industries, Inc., Sycamore, Ill.

Filed Jun. 13, 1986, Ser. No. 874,072
Int. Cl.[4] H01R *4/12*
U.S. Cl. 174—87 **4 Claims**



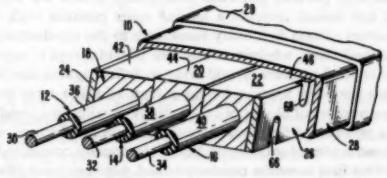
1. In an electrical connector of the screw-on type for joining the ends of two or more electric wires, a cap of stiffly flexible insulating thermoplastic material having a generally central bore open at one end and closed at the other end by an integral end wall, and a generally tapered wire coil in the bore arranged to receive and be turned down over the stripped ends of a plurality of electric wires, at least a substantial extent of the circumferential exterior of the wire coil adhering to the central bore of the cap, substantially all of the exterior of the coil in contact with the cap being adheringly joined therein to form a substantial circumferential interlock therewith of sufficient strength alone to withstand the rotative forces between the cap and coil when the connector is being tuned down on and removed from the stripped ends of a plurality of electric wires.

4,707,568

ARMORED POWER CABLE WITH EDGE SUPPORTS

Ernest G. Hoffman, Middlefield, and David H. Neuroth, Hamden, both of Conn., assignors to Hubbell Incorporated, Orange, Conn.

Filed May 23, 1986, Ser. No. 866,290
Int. Cl.[4] H01B *7/18*
U.S. Cl. 174—103 **21 Claims**



14. A power cable comprising:
at least two power conveying lines extending substantially parallel along the longitudinal axis of the cable;
at least two protective layers, each of said protective layers completely enclosing one of said power conveying lines, said layers being arranged side-by-side and in contact and forming a row having a left end, a right end, a top surface and a bottom surface;
a pair of rigid support members for resisting compressive forces directed transverse to the row of protective layers, one of said support members being located at each said end of said row; and
an armor covering enclosing said support members, said protective layers and said power conveying lines;
said support members being located between said row ends and said armor covering but not extending between said top and bottom surfaces and said armor covering;
said armor covering being in contact with said top and bottom surfaces;
said support members having a height at least equal to the height of said protective layers.

4,707,569

MULTI-CONDUCTOR CABLE

Shohei Yoshimura, Tomioka; Shigeki Fujimura, and Itaru Sakamoto, both of Tokyo, all of Japan, assignors to Japan Styrene Paper Corporation, Tokyo, Japan

Filed May 23, 1986, Ser. No. 866,313
Claims priority, application Japan, Jun. 3, 1985, 60-83549[U]; Sep. 10, 1985, 60-137604[U]
Int. Cl.[4] H01B *7/02*
U.S. Cl. 174—116 **4 Claims**

1. A cable comprising:
a core made of a plurality of insulated conductors, and
a sheath surrounding the core,
the void space between the core and the sheath and between the insulated conductors being filled with space fillers which include a plurality of strings, each of said strings being a composite formed of a reinforcing strip and a foamed plastic layer integrally bonded to said strip, said strip being formed of a plastic material stretched in the lengthwise direction.

4,707,570

MANUAL INFORMATION INPUT DEVICE

Yukio Ide; Teruyuki Ohnuma, and Yoshiyuki Kageyama, all of Shizuoka, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

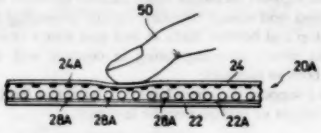
Filed Feb. 12, 1986, Ser. No. 828,823
Claims priority, application Japan, Feb. 12, 1985, 60-25044; Feb. 12, 1985, 60-25045
Int. Cl.[4] G08C *21/00*
U.S. Cl. 178—18 **20 Claims**

1. A manual information input device comprising:
a substrate supporting electrodes on one surface thereof;
a resilient input panel disposed in facing relation to said substrate and supporting electrodes in confronting relation to said electrodes on the substrate;

a spacer disposed between said substrate and said flexible input panel and defining a closed space therebetween;

an electrically insulating, flowable, viscous material sealed in said space;

said electrodes on said substrate and said input panel jointly constituting a pixel matrix; and



said electrically insulating material comprising a group of particles and/or a liquid, said liquid filling said space when it is sealed in said space either singly or in combination with said group of particles.

4,707,571

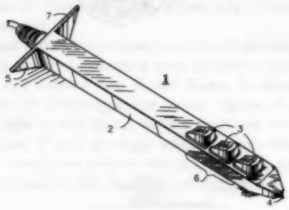
ERGONOMIC DIGITIZER STYLUS

Brad Clements, Fort Collins, and John C. Keith, Loveland, both of Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Oct. 29, 1986, Ser. No. 924,248

Int. Cl.[4] G08C *21/00*

U.S. Cl. 178—18 **2 Claims**



1. A digitizer stylus or the like comprising:

a body of generally triangular cross section extending along a longitudinal axis and formed of a top surface and two adjacent nonparallel sides intersecting along the underside of the body;

a tip at one end of the body, the tip inclined away from the longitudinal axis in a first direction toward the line of intersection by a first acute angle; and

switch means, disposed upon the top surface and having an actuating surface for receiving a force to activate the switch means, the actuating surface being inclined away from the top surface in a second direction, opposite the first, by a second acute angle, and being hinged to the top surface in the vicinity of where the inclined actuating surface intersects the top surface.

4,707,572

TRACER FOR ELECTROGRAPHIC SURFACES

Robert G. Kable, Dublin, and Philip A. Schlosser, Columbus, both of Ohio, assignors to Scriptel Corporation, Columbus, Ohio

Filed Oct. 22, 1986, Ser. No. 922,090

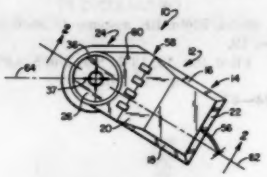
Int. Cl.[4] G08C *21/00*

U.S. Cl. 178—18 **17 Claims**

1. In an electrographic system wherein coordinate data signals are derived by interaction with a position responsive surface, the improved operator controlled tracer comprising:

a body portion configured for being manually grasped by said operator;

an electrically insulative transparent reticle support of predetermined peripheral extent mounted to and forwardly of said body portion having a downwardly disposed surface for positioning in adjacency with said position responsive surface and an upwardly disposed surface through which said position responsive surface may be viewed; and



reticle means including two electrically conductive crosshair lines of select width for providing a visual position locator, and an electrically conductive symmetrically configured geometric shape of predetermined width and of peripheral extent less than said reticle support peripheral extent, symmetrical about said line intersection and electrically coupled therewith, said crosshair lines and said shape selectively effecting electrical interaction with said position responsive surface.

4,707,573

ELECTRICAL CONDUCTOR ARRAY

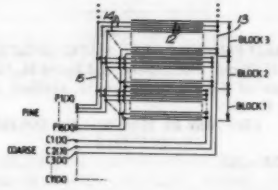
Harry J. C. Etherington, Surrey; Paul C. Joslin, Berkshire, both of England; David E. Carr, Springfield, Va., and Raymond Simpson-Davis, Hants, England, assignors to The De La Rue Company, England

Filed Oct. 23, 1986, Ser. No. 922,320

Claims priority, application United Kingdom, Oct. 23, 1985, 8526113

Int. Cl.[4] G08C *21/00*

U.S. Cl. 178—18 **13 Claims**



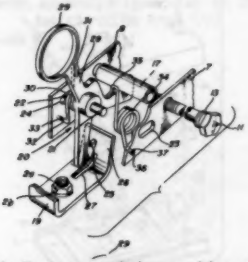
1. A pressure pad comprising first and second arrays of substantially parallel electrical conductors which are superposed and biased towards a spaced apart position with the conductors of said first array transverse to the conductors of said second array, wherein at least one of said arrays is responsive to applied pressure on said array to deflect against said bias towards the other array, wherein at least said first array comprises a number of blocks of substantially parallel first conductors, a number of first and second common conductors, said first conductors of each block being electrically connected to respective first common conductors and, between pairs of said first conductors of each block, a respective second conductor, corresponding second conductors from each block being electrically connected to a respective second common conductor, and wherein said conductors of said arrays are adapted to be connected to processing means to enable the position of applied pressure to be determined.

4,707,574

DISCONNECT SWITCH WITH LATCH

Wayne A. Smith, Tucker, Ga., assignor to Kearney-National, Inc., Atlanta, Ga.

Filed Oct. 23, 1986, Ser. No. 922,299
Int. Cl.[4] H01H *21/56*
U.S. Cl. 200—48 KB 6 Claims



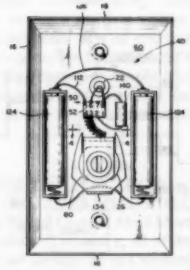
1. An electric disconnect switch comprising a fixed contact, a movable contact arranged to engage and to disengage said fixed contact, a latch mounted for limited oscillating and sliding movement on said movable contact and having a part engageable and disengageable with an operating member, a latch engaging ramp fixedly mounted on said fixed contact and having a slot including a latching surface at one end of said slot and engageable by said latch, biasing means arranged to bias rotation of said latch in a direction to maintain said latch in engagement with said ramp and with said latching surface, and low friction means mounted on said movable contact and engageable with a part of said latch during a switch closing operation to facilitate sliding movement of said latch relative to said movable contact whereby switch closing movement is imparted to said moveable contact in response to switch closing movement of said operating member.

4,707,575

SPRING SWITCH FOR ELECTRONIC CIRCUITS

Michael H. Krasik, 1849 North 53rd St., Seattle, Wash. 98103

Filed Aug. 26, 1986, Ser. No. 900,503
Int. Cl.[4] H01H *1/06, 35/00*
U.S. Cl. 200—52 R 2 Claims



1. A low profile switch for electronic circuitry, comprising:

a mounting plate having an electrically conductive surface;

an electrically conductive coil spring defining a coil axis and having a plurality of closely spaced, helical coil turns, a fixed portion and a free portion, the free portion being movable between a rest position in which the coil axis is substantially linear and a displaced position in which the coil axis is non-linear;

a dual in-line packaged, integrated circuit having two legs electrically and physically connected to and supporting the coil spring fixed portion so that the coil spring free portion in the rest position is spaced apart from the conductive surface so as to form an air gap therebetween and a non-conductive package body for electrically insulating the coil spring fixed portion from the mounting plate electrically conductive surface;

means for selectively moving the coil spring free portion from the rest position to the displaced position and for wiping and contacting the coil spring free portion against the electrically conductive surface to establish electrical continuity therebetween; and

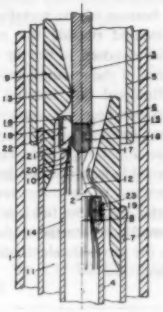
an electronic circuit having a light source, means for intermittently energizing the light source and two open circuit terminals, one terminal electrically connected to the coil spring and the other terminal electrically connected to the conductive surface.

4,707,576

ARCING CONTACT TIP AND METHOD FOR PRODUCING SUCH AN ARCING CONTACT TIP OR A COMPARABLE COMPONENT

Gernot Gessinger, Birmenstorf; Renata Sebalj, Rutihof-Baden, and Wolfgang Widl, Glattbrugg, all of Switzerland, assignors to BBC Brown, Boveri & Co., Ltd., Switzerland

Filed May 28, 1986, Ser. No. 867,532
Claims priority, application Switzerland, Jun. 24, 1985, 2676/85; Aug. 23, 1985, 3650/85
Int. Cl.[4] H01H *33/12*
U.S. Cl. 200—146 R 18 Claims



14. An arc withstanding electrode which is effective for withstanding an arc and mechanical stresses which develop between said arc electrode and another arc electrode, said arc electrode being formed of carbon-fiber-reinforced-graphite material which material comprises graphite matrix and a plurality of carbon fibers embedded in said graphite matrix.

4,707,577

VACUUM INTERRUPTER

Nobuaki Tamaki, Numazu; Shinzo Sakuma, Kawasaki; Toshimasa Fukai, and Masatoshi Takihana, both of Numazu, all of Japan, assignors to Kabushiki Kaisha Meidensha, Tokyo, Japan

Filed Mar. 27, 1987, Ser. No. 31,693
Int. Cl.[4] H01H *33/66*
U.S. Cl. 200—144 B 7 Claims

1. A vacuum interrupter, comprising:

a vacuum envelope including an insulating cylinder, a metal end plate hermetically sealed to one edge of the insulating cylinder and a bottomed metal cylinder having its open end hermetically sealed to the other edge of the insulating cylinder;

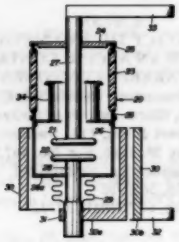
a pair of disc-shaped electrodes comprising a stationary electrode and a movable electrode disposed facing each

other within the metal cylinder, said movable electrode being movable for establishing or interrupting contact with said stationary electrode;

a stationary lead rod passing hermetically through the metal end plate and the insulating cylinder and fixed to the metal end plate, the stationary lead rod having an inner end fixed to the stationary electrode;

a movable lead rod passing through the bottom of the metal cylinder and being movable coaxially with the stationary lead rod, the movable lead rod having an inner end fixed to the movable electrode and having an outer end located outside the vacuum envelope, the movable lead rod being shorter than the stationary lead rod;

a metal bellows surrounding part of the movable lead rod



and hermetically and electrically connecting the movable lead rod to the bottom of the metal cylinder, the metal bellows being located outside the metal cylinder and having an exterior exposed to the air and an interior exposed to a vacuum of the vacuum envelope; and

a substantially cylindrical coil located outside the metal cylinder and surrounding the stationary and movable electrodes, the coil having one end electrically connected to the movable lead rod via a slide contact engaging the surface of the movable lead rod and having the other end electrically connected to an outer lead means, the coil producing an axial magnetic field in parallel to an arc current path formed between the stationary and movable electrodes when the movable electrode is separated from the stationary electrode.

4,707,578

KEY OPERATED PRINTED CIRCUIT SWITCH

Gottfried Burkhardt, Winkelhaid, Fed. Rep. of Germany, assignor to Triumph-Adler A.G., Fed. Rep. of Germany

Filed Dec. 20, 1985, Ser. No. 811,437

Claims priority, application Fed. Rep. of Germany, Feb. 14, 1985, 3505033

Int. Cl.[4] H01H *1/24, 1/50, 13/00*

U.S. Cl. 200—159 A **4 Claims**

1. A key operated switch for keyboards comprising a frame-like key support defining a compartment,

a first printed circuit conductor on said key support,

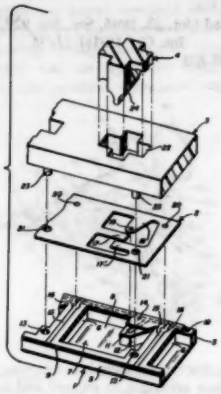
an insulating layer overlying said first printed circuit conductor except for a contact portion of said first printed circuit conductor,

a second printed circuit conductor overlying said insulating layer

a flat conductive spring overlying and contacting said second printed circuit conductor, said spring having a cutout defining a contact element and two return springs directed to overly said compartment for interaction with a depressible key stem,

a key guide overlying said flat conductive spring, and

a depressible key stem supported in said guide acting upon depression against said return springs and on said contact element to bring said contact element into contact with



said contact portion of said first printed circuit conductor thereby to bridge said first and second printed conductors.

4,707,579

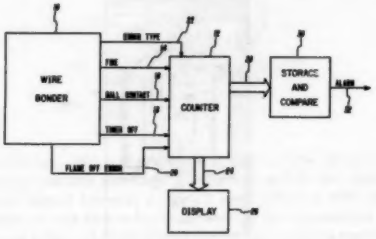
REAL-TIME TAIL LENGTH MONITOR FOR WIRE BONDING FLAME-OFF APPARATUS

Frank A. McKiel, Jr., Dallas, Tex., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Feb. 24, 1987, Ser. No. 18,258

Int. Cl.[4] B23K *11/22*

U.S. Cl. 219—56.22 **6 Claims**



1. The method of time checking the operation of electronic flame-off apparatus comprising the steps of:

applying a high voltage arc to a bonding wire extending from a capillary tip of a wire bonding means;

monitoring the voltage slope of the applied voltage arc;

terminating the application of the high voltage arc when a negative slope is detected;

detecting the time between the steps of applying and terminating the high voltage arc and;

outputting an indication of the detected time whereby the quality of bonds made by the apparatus can be ascertained.

4,707,580

WIRE-CUT ELECTRICAL DISCHARGE MACHINE

Toshiyuki Aso, and Hiroshi Kinoshita, both of Hino, Japan, assignors to Fanuc Ltd., Yamanashi, Japan

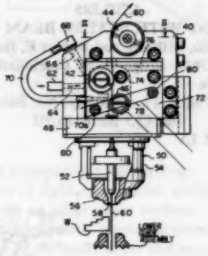
PCT No. PCT/JP85/00458, § 371 Date Apr. 23, 1986, § 102(e) Date Apr. 23, 1986, PCT Pub. No. WO86/01445, PCT Pub. Date Mar. 13, 1986

PCT Filed Aug. 16, 1985, Ser. No. 859,988

Claims priority, application Japan, Aug. 27, 1984, 59-176702

Int. Cl.[4] B23H *7/02, 7/10*

U.S. Cl. 219—69 W 5 Claims



1. Wire-cut electrical discharge machine, capable of carrying out wire-cut electrical discharge machining of an electrically conductive workpiece by means of an electrode wire, comprising:

upper and lower guide assemblies disposed, respectively, above and below said workpiece, each having electrode wore guiding means for guiding said electrode wire, which runs from one toward the other of said upper and lwoer guide assemblies, and a feeder pin for applying a discharge voltage to said electrode wire;

a cooling liquid suply means for at least one of said upper guide assembly and lower guide assembly, said cooling liquid supply means including a main supply passage communicating with an external source of cooling liquid for distributing said cooling liquid to said electrode wire guiding means for cooling aid electrode wire;

a cooling liquid sump formed so as to surround said feeder pin and form a cooling liquid chamber separating said feeder pin from said electrode wire guiding means;

a branch passage communicating with said main supply passage and having a restrictor valve therein to regulate the effective sectional area of said branch passage; and

conduit means connected between said restrictor valve and said cooling liquid sump to supply liquid from said branch passage that passes said restrictor valve to said cooling liquid sump as the only source of cooling liquid thereto.

4,707,581

APPARATUS FOR THE ELECTROSLAG SURFACING OF ROLLING MILL ROLLS

Pavol Blaskovits; Stefan Lesnak; Aloiz Martisik; Jan Zajac; Jan Slavkovsky; Ladislav Turiansky, all of Bratislava, and Rudolf Levius, Ivanka pri Dunaji, all of Czechoslovakia, assignors to Vyskumny ustav zvaracsky, Bratislava, Czechoslovakia

Filed Jul. 22, 1985, Ser. No. 757,743

Claims priority, application Czechoslovakia, Jul. 20, 1984, 5584-84

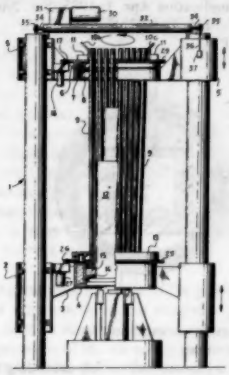
Int. Cl.[4] B23K *25/00, 9/04*

U.S. Cl. 219—73.11 4 Claims

1. An apparatus for electroslag surfacing of rolls, comprising means for holding a roll in vertical position,

a vertically movable platform bearing a sleeve which receives the roll therewithin and carries an annular crystallizer which surrounds a surface of the roll to be surfaced, said sleeve being provided with rotatable electrode guiding means, which means are insulated relative to said crystallizer,

means including an upper platform for supporting upper ends of a plurality of generally vertically downwardly



extending electrodes forming a set surrounding the roll, the lower ends of the electrodes extending into the crystallizer, and

means for rotating the set of electrodes about the roll during electroslag surfacing of the roll.

4,707,582

METHOD AND APPARATUS FOR OPERATING AN INDUSTRIAL ROBOT WITH SENSOR-CORRECTION

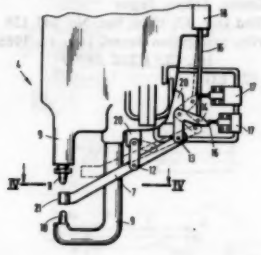
Hasso Beyer, Kreuzeckstr. 9, 8900 Augsburg, Fed. Rep. of Germany

Filed Jun. 23, 1986, Ser. No. 877,409

Claims priority, application Fed. Rep. of Germany, Jun. 24, 1985, 3522581

Int. Cl.[4] B23K *11/00*

U.S. Cl. 219—86.41 4 Claims



1. A processing device for an industrial robot, adapted to be connected thereto for the accurate processing of workpieces, and including in combination: sensor means by which the position of the processing device, in relation to a workpiece, may be accurately detected in at least one dimension, welding tongs having two electrodes for spot welding, said welding tongs being separated in their inoperative position, and means for mounting said sensor between the two electrodes of the welding tongs when said welding tongs are separated and out of contact with said workpiece.

4,707,583

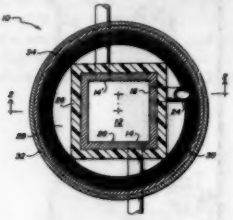
PLASMA HEATED SINTERING FURNACE

Jonathan J. Kim, Williamsville, and Viswanathan Venkateswaran, Grand Island, both of N.Y., assignors to Kennecott Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 533,596, Sep. 19, 1983, Pat. No. 4,559,312. This application Apr. 1, 1985, Ser. No. 718,376

Int. Cl.[4] B23K *9/00*

U.S. Cl. 219—121 P 4 Claims



1. A sintering furnace comprising:

(a) a sintering chamber;

(b) a least one first plasma torch inlet, extending through the exterior of the furnace through walls of said sintering chamber and positioned near the top of said sintering chamber;

(c) at least one exhaust outlet below said first torch inlet and positioned near the bottom of said sintering chamber;

(d) at least one second plasma torch inlet asymmetrically positioned to said at least one first torch inlet extending through walls of said sintering chamber facing the walls through which said at least one first torch inlet extends and positioned on that wall near the center of said sintering chamber and above said at least one exhaust outlet; and

(e) means for controlling the plasma sintering temperature so that an article being sintered does not decompose;

said positioning of said first torch inlet, second torch inlet, and exhaust outlet creating convective turbulence in the sintering chamber during sintering.

4,707,584

DUAL-POLARIZATION, DUAL-FREQUENCY CUTTING MACHINE

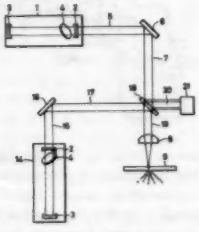
Yoshihide Kimbara, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 12, 1986, Ser. No. 941,138

Claims priority, application Japan, Dec. 12, 1985, 60-279822

Int. Cl.[4] B23K *26/00*

U.S. Cl. 219—121 LG 6 Claims



1. A laser beam machine for cutting a workpiece with a laser, comprising:

a first laser source providing a circularly polarized clockwise laser beam of a first frequency;

a second laser source providing a circularly polarized counterclockwise laser beam of a second frequency different from said first frequency;

means for combining said clockwise and counter clockwise beams into a combined beam; and

means for directing said combined beam along a direction to a workpiece to be cut.

4,707,585

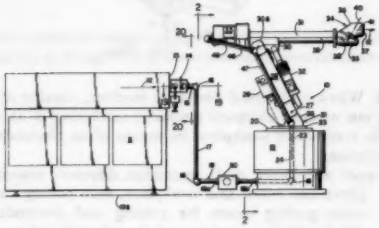
LASER WRIST WITH SEALED BEAM PATHWAY

Robert C. Monteith, Milford, and Robert E. Borgmann, Cincinnati, both of Ohio, assignors to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed Mar. 17, 1986, Ser. No. 840,167

Int. Cl.[4] B23K *26/02*

U.S. Cl. 219—121 LV 7 Claims



1. A sealed-beam laser wrist, including:

a base housing, having

a first wrist axis;

a turret housing, mounted to said base housing and rotatable about

a second wrist axis, transverse to, and intersecting said first wrist axis at

a junction point;

means for driving said turret housing about said second axis., said means for driving including drive elements passing within said base housing; and

means for mounting said base housing to a laser forearm assembly;

wherein the improvement comprises:

a mirror chamber within said base housing, said junction point lying within said chamber;

a mirror mounted within said mirror chamber, said mirror having a mirror reflecting surface intercepting said junction point;

a continuous laser beam pathway through said base housing, said mirror chamber and said turret housing, said beam pathway extending collinearly with said first and second wrist axes from a beam entrance end defined on said base housing, to a beam exit end defined on said turret housing;

first duct means enclosing said first wrist axis and communicating with said mirror chamber and said base housing beam entrance end;

second duct means enclosing said second wrist axis and communicating with said mirror chamber and said turret housing beam exit end; and

rotary slip joint means in said second duct means for permitting said turret housing to rotate with respect to said base housing while maintaining enclosure of said second wrist axis

whereby said laser beam pathway is enclosed with respect to said driving elements passing within said base housing.

4,707,586

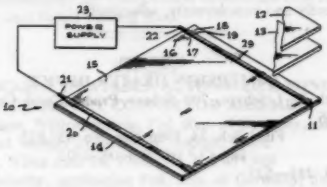
ELECTRO CONDUCTIVE FILM SYSTEM FOR AIRCRAFT WINDOWS

David L. Voss, Van Nuys; Howard S. DeCamp, Northridge, and Gordon W. Culp, Van Nuys, all of Calif., assignors to Sierracin Corporation, Sylmar, Calif.

Continuation-in-part of Ser. No. 262,494, May 11, 1981, abandoned. This application Sep. 7, 1983, Ser. No. 529,975

Int. Cl.[4] B60L *1/02*

U.S. Cl. 219—203 **8 Claims**



1. A composite transparency comprising:

(a) an outer layer of rigid, transparent, electrically insulating material having an inner major surface;

(b) a transparent electrically insulating basecoat on the inner major surface of the outer layer and secured thereto;

(c) a plurality of spaced apart electroconductive metal film runs comprising a strike coat portion vacuum deposited in adhering relationship onto the basecoat and an electroplated portion electrodeposited onto the strikecoat portion;

(d) a transparent interlayer of relatively flexible electrically insulating plastic bonded to the transparent basecoat on the inner major surface of the outer layer to thereby sandwich the spaced apart electroconductive metal film runs between the basecoat and the interlayer; and

(e) electrical connection means connecting the electroconductive metal film runs to a voltage source.

4,707,587

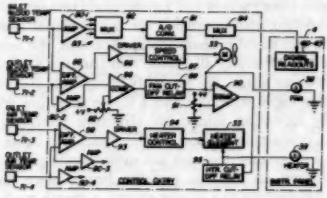
BLOOD WARMING METHOD AND APPARATUS USING GASEOUS HEAT EXCHANGE MEDIUM

Gordon M. Greenblatt, 5533 N. 3rd St., Phoenix, Ariz. 85012

Filed Jan. 27, 1986, Ser. No. 822,657

Int. Cl.[4] H05B *1/02*

U.S. Cl. 219—299 **32 Claims**



1. A method of warming chilled fluid forced out of a pressure infusion device, the method comprising the steps of:

(a) inserting a flexible disposable fluid warming jacket into a fluid warming device, the fluid warming jacket having an inlet and an outlet and a plurality of thin elongated fluid conducting paths leading from the inlet to the outlet, the fluid warming device having a narrow, deep elongated recess for receiving the fluid arming jacket, the recess being bounded by a pair of thermally conductive opposed major walls, each thermally conductive wall having a heat exchanger in thermal contact therewith;

(b) guiding air from an outlet of an electric blower through an electric heating element to heat the air to a predetermined temperature;

(c) guiding the heated air from the heating element through the heat exchangers to heat the major walls;

(d) forcing chilled fluid from the pressure infusion device into the inlet of the fluid warming jacket, thereby causing the chilled fluid to be forced into the plurality of fluid conducting paths of the fluid warming jacket and causing the fluid warming paths to expand, thereby causing the fluid warming jacket to tightly contact the heated major walls of the recess, whereby fluid moving through the fluid conducting paths is heated;

(e) guiding air from a downstream portion of the heat exchangers to an inlet of the electric blower to thereby recycle and reheat that air;

(f) sensing the temperature of the fluid near the outlet of the fluid warming jacket; and

(g) immediately controlling the temperature of the heating element in response to the sensed fluid temperature to rapidly correct any overtemperature condition in the fluid,

whereby the low heat capacity of the guided, heated air is so low that corrections in the temperature of the heating element lead to immediate corresponding corrections in the temperature of the air and prevent temperature overshoot of the fluid as the fluid absorbs heat from the air during the temperature correction so that the temperature of the guided air can be be increased to allow increased flow of the fluid without danger of overheating portions of the fluid.

4,707,588

CONVECTION COOKING APPARATUS

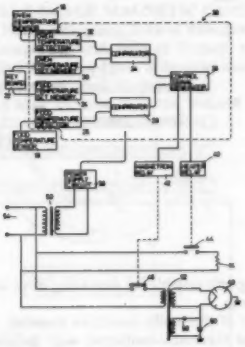
Masafumi Takazume, Osaka, and Kazuhiko Ishikawa, Kashiwara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation-in-part of Ser. No. 715,290, Mar. 25, 1985, Pat. No. 4,633,065, which is a continuation of Ser. No. 443,698, Nov. 22, 1982, abandoned. This application Sep. 11, 1986, Ser. No. 906,028

Claims priority, application Japan, Nov. 26, 1981, 56-176285[U]

Int. Cl.[4] H05B *11/00*

U.S. Cl. 219—400 **1 Claim**



1. A convection cooking apparatus, comprising:

a convection heater for maintaining an oven temperature at a preselected value, said convection heater being intermittently energized;

a magnetron for cooking a foodstuff within said oven;

a keyboard panel for introducing said preselected oven temperature at which a cooking operation should be per-

formed, and a desired food temperature at which the cooking operation should be completed;

a first memory for storing said preselected oven temperature introduced from said keyboard panel;

a second memory for storing said desired food temperature introduced from said keyboard panel;

oven temperature measuring means for measuring an actual oven temperature;

a first comparator for comparing said actual oven temperature measured by said oven temperature measuring means with said desired oven temperature stored in said first memory;

a first control system for intermittently energizing said convection heater in response to an output signal developed from said first comparator for maintaining the actual oven temperature at said desired oven temperature;

food temperature measuring means for measuring an actual food temperature;

a second comparator for comparing said actual food temperature measured by said food temperature measuring means with said desired food temperature stored in said second memory;

means for energizing said magnetron in response to a signal operated by said second comparator; and

a second control system for terminating the cooking operation in response to an output signal developed from said second comparator so that the cooking operation is terminated when said actual food temperature reaches said desired food temperature, said output signals from the first and second comparators being applied to a control signal generator for controlling power supply to the convection heater and the magnetron, whereby microwave heating and convection heating are simultaneously conducted until a preset temperature is reached within the atmosphere of the apparatus.

4,707,589

HEATING APPARATUS

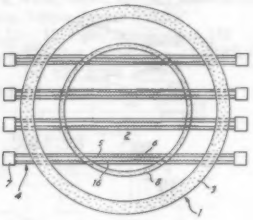
Steve M. Brooks, Chingford, and David R. May, Cheshunt, both of England, assignors to Thorn Emi Patents Limited, Hayes, England

Division of Ser. No. 733,802, May 14, 1985, Pat. No. 4,639,579. This application Nov. 13, 1986, Ser. No. 929,793

Claims priority, application United Kingdom, May 15, 1984, 8412339

Int. Cl.[4] H05B *3/76*

U.S. Cl. 219—464 **4 Claims**



1. A heating unit suitable for mounting in a cooking hob, said unit comprising:

a base layer of thermally-insulative material;

a peripheral thermally-insulative wall defining a first hotplate region;

an inner thermally-insulative wall defining a second hotplate region located within said first region;

a lamp having first and second pinch seals and electrical connection means sealed in said pinch seals, said lamp comprising a tubular envelope and means for emitting infra-red radiation supported in said envelope;

means for supporting said lamp such that said envelope extends across said first hotplate region and said first and second pinch seals are located outside of said first region;

said means for emitting infra-red radiation comprising a first length of linear filament commensurate with said first region and a second length of linear filament commensurate with said second region, at least said first length having first and second ends connected respectively to said electrical connection means sealed in said first and second pinch seals; and

means, connectable to said electrical connection means, for energizing said first and second filament lengths independently and concurrently, selectively.

4,707,590

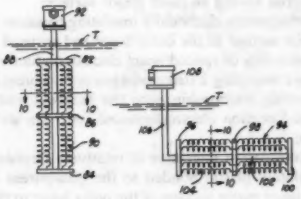
IMMERSION HEATER DEVICE

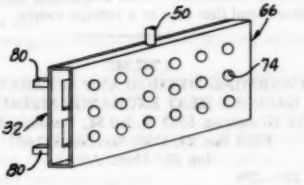
Fredrick L. Lefebvre, 700 Solano Prada, Coral Gables, Fla. 33156

Filed Feb. 24, 1986, Ser. No. 832,823

Int. Cl.[4] H05B *3/06, 3/02*

U.S. Cl. 219—523 **10 Claims**





1. An electric immersion heater assembly having a relatively small, portable construction and having good temperature and corrosion resistant characteristics for use in metal finishing, metal plating and metal preparation applications, the assembly being made of a generally all plastic construction adapted for ready throw-away usage, the assembly comprises, in combination, a flexible cable structure and a frame structure adapted for operably mounting said cable structure interiorly of a treating tank containing a liquid heating fluid, said cable structure having a maximum diameter not substantially greater than ¼ inch including an electric metallic heater wire element adapted for connection to a power source, a sheath made from a relatively thin layer of fluoropolymeric material disposed in close fitting relation around said heater wire element throughout its length thereof, a conductive metallic ground wire element disposed in engagement with and extending throughout the length of said sheath, an insulating barrier wire of high temperature insulation encapsulating said ground wire element throughout its length thereof, an outer tubular sheath made from a fluoropolymeric material disposed in encapsulating relation around said insulating barrier layer substantially throughout its length to provide said cable structure, the improvement comprising the said cable structure being made into a plurality of individual coil members each having a series of axially spaced coil turn elements defining a self-supporting,

spring-like configuration, said cable structure having said maximum ¼ inch diameter with the coil turn elements each having an outside diameter greater than ¼ inch and up to 1 inch with said coil turn elements being axially spaced apart in the range between 2:1 to 5:1 in respect to the ratio of the said ¼ inch maximum outside diameter of said cable structure, said support frame structure including at least one frame member made from a polymeric material, said spring-like coil turn elements being connected in supported relation on said frame member and laterally spaced from one another, adjacent ends of said coil turn elements being integrally and electrically connected in circuit and adapted for energization to produce heat energy for heating said liquid heating fluid.

4,707,591

ELECTRICALLY HEATABLE AUTOMOBILE WINDOW POWER-SUPPLY CONNECTOR ASSEMBLY

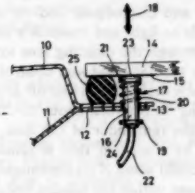
Willi Sprenger, Wallrabenstein, Fed. Rep. of Germany, assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 24, 1986, Ser. No. 877,810

Claims priority, application Fed. Rep. of Germany, Jun. 28, 1985, 3523228

Int. Cl.⁴ H05B *3/08*; H01R *11/22*; H01H *3/62*

U.S. Cl. 219—541 **9 Claims**



1. An electrically heatable window of a motor vehicle having resistance heating strips extending over at least part of the window area, a bus bar electrically connecting the resistance heating strips to each other, a contact on the window associated with the resistance heating strips, and a counter-contact on the motor vehicle body which is connected to an electrical power source such as the motor vehicle battery, contact and counter-contact being constructed as push contacts such that in the assembled or closed position of the window, the contact and counter-contact engage each other with additional spring pressure, closing the electrical circuit between the resistance heating strips and the power source characterized in that,

the contact on the window consists of the bus bar itself and the counter-contact on the motor vehicle body is disposed on a flange like edge which serves as a support surface for the window in the assembled or closed position and comprises a compression spring-loaded pin which extends perpendicularly or essentially perpendicularly to the window surface and which is movable in the direction perpendicularly or essentially perpendicularly of the window surface, said spring loaded pin being connected at its rear end to a power cable connected to an electrical power source and operatively connected to the bus bar at its front end surface.

4,707,592

PERSONAL UNIVERSAL IDENTITY CARD SYSTEM FOR FAILSAFE INTERACTIVE FINANCIAL TRANSACTIONS

Paul N. Ware, P.O. Box 509, Summerville, Fla. 30747-0509

Filed Oct. 7, 1985, Ser. No. 784,954

Int. Cl.⁴ G06F *15/30*

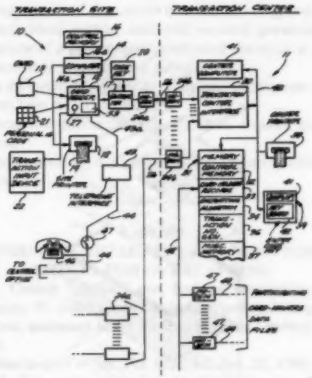
U.S. Cl. 235—379 **26 Claims**

1. A financial and identification card transaction system for protecting transactions between a plurality of cardholders, each having a card, with a machine-readable code imprinted thereon and a card-issuing organization via at least one transaction site connected by a data channel with a remote transaction center, the system which comprises:

a card reader disposed at the transaction site for reading the machine-readable code imprinted on the card, the machine readable code including a cardholder code that is unique to each cardholder;

a transaction number that uniquely identifies each transaction;

a transaction number store included with the card reader for



receiving and storing the transaction number from the transaction center;

a transaction data input device connected to the card reader for receiving transaction data;

a printer connected to the card reader for printing a transaction ticket which includes the transaction number;

a center computer disposed at the transaction center having memory for storing transaction data received from the card reader via the data channel;

a transaction number generator included with the center computer for generating the transaction number.

4,707,593

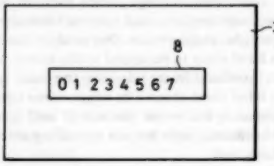
VISIBLE IMAGE MAGNETIC CARD

Yasuzo Murata; Takeo Yokoyama, both of Kanagawa; Hiroyuki Wada, and Masaaki Sakurai, both of Tochigi, all of Japan, assignors to Pilot Man-Nen-Hitsu Kabushiki Kaisha and The Nippon Signal Co., Ltd., both of, Japan

Filed May 23, 1986, Ser. No. 866,418

Int. Cl.⁴ G06K *19/00*

U.S. Cl. 235—487 **17 Claims**



1. A visible image magnetic card comprising; a magnetic recording sheet comprising a magnetic recording layer and a base sheet, a display sheet having a transparent display area, a display cell formed between said magnetic recording sheet and said display sheet, said display cell having confined therein a

mixture of magnetic particles and a transparent or translucent fine fluidizing powder.

4,707,594

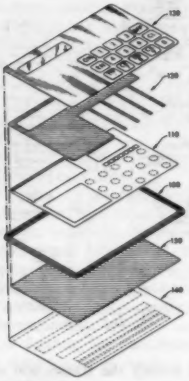
UNITARY, SELF-CONTAINED CONSUMER TRANSACTION CARD

Gary L. Roth, Elizabeth, Colo., assignor to Intellicard International, Inc., Colorado Springs, Colo.

Filed Jun. 27, 1985, Ser. No. 750,489

Int. Cl.[4] G06K *19/02, 19/08*

U.S. Cl. 235—488 **9 Claims**



9. An improved consumer transaction card having a display, associated internal electronics for operating said display, and raised embossed consumer information, said improved card comprising:

an outer support frame having a thickness equal to the thickness of said card at the peripheral edge of said card, said frame forming the outer periphery of said card and said frame further having an inwardly extending support lip formed at the mid-point region of the inner surface of said frame,

a printed circuit board carrying said display and said associated electronics,

a top label sheet having formed thereon a formed clear window for said display, said top label sheet having an outer peripheral dimension that enables the edges of said top label sheet to be sealed to the upper surface of said support lip of said frame whereby the outer surface of said top label sheet when sealed lies in the same plane as the upper surface of said frame,

first means located hetween said top label sheet and said printer circuit board for firmly engaging said top label sheet to said printed circuit board,

a bottom label sheet having placed thereon said embossed consumer information, said bottom label sheet having an outer peripheral dimension that enables the edges of said bottom label sheet to be sealed to the lower surface of said support lip of said frame whereby the outer surface of said bottom label sheet around its edges when sealed lies in the same plane as the lower surface of said frame, said embossed consumer information extending above the aforesaid plane, and

second means located between said bottom label and said printed circuit board for firmly engaging said bottom label sheet to said printed circuit board, said outer support frame being capable of sealing the peripheral ends of said top label sheet, said first engaging means, said printed circuit board, said second engaging means, and said bottom label sheet.

4,707,595

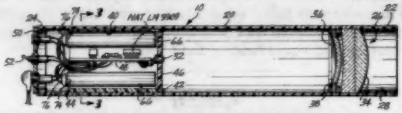
INVISIBLE LIGHT BEAM PROJECTOR AND NIGHT VISION SYSTEM

Brad E. Meyers, 17525 NE. 67th Ct., Redmond, Wash. 98052

Continuation of Ser. No. 696,444, Jan. 30, 1985, abandoned. This application Dec. 29, 1986, Ser. No. 3,253

Int. Cl.[4] G01J *1/00*

U.S. Cl. 250—504 R **34 Claims**



1. An invisible light beam projector, comprising: a tubular body having a forward end and a rearward end;

an invisible light beam emitting diode having an emitting lens;

mounting means inside of said tubular body mounting the diode at a location within the body, between the two ends of the body, with the lens of the diode directed towards the forward end of the body;

control circuit means for the diode adapted to be repetitiously charged and discharged, and on each discharge causing the diode to light and transmit a narrow beam of invisible light through the emitting lens towards the forward end of the tubular body said control circuit means functioning to turn the diode on and off at a rate resulting in the diode being on between about 10–20% of the time and off during the remainder of the time, and when on being powered by a current that is substantially larger than the diode could stand if on continuously; and

projection lens means within the tubular body, forwardly of the diode, of a type which is always in focus in a range between a predetermined minimum distance from the light projector and infinity, said projection lens means being positioned and adapted to receive the narrow beam of invisible light from the diode lens and enlarge and collimate this light into a collimated beam of invisible light in sharp focus, to produce a lighting spot having a sharp and definite edge.

4,707,596

ARTICULATED OPTICAL SYSTEM HAVING AN ARRANGEMENT FOR CORRECTING THE POSITION OF A LASER BEAM

Gerhard Hohberg, Oberkochen, Fed. Rep. of Germany, assignor to Carl-Zeiss-Stiftung, Heidenheim, Fed. Rep. of Germany

Filed Aug. 12, 1986, Ser. No. 896,140

Claims priority, application Fed. Rep. of Germany, Aug. 23, 1985, 3530189

Int. Cl.[4] G05D *3/12;* B23K *26/04*

U.S. Cl. 250—201 **9 Claims**

1. In an articulated optical system having an input end and an output end and deflecting means defining a beam path therebetween for guiding a laser beam along an optical axis, an arrangement for correcting the position of said laser beam, the arrangement comprising:

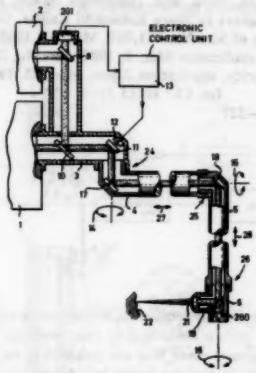
beam-splitter means for splitting off a portion of the rays of the laser beam to form a component beam;

retroreflecting means for reflecting said component beam back to said input end;

both said retroreflecting means and said beam-splitter means being mounted in the region of said output end;

position-sensitive detector means arranged at said input end of said optical system for receiving said component beam and for generating a signal indicative of a displacement of said component beam from said optical axis;

a control unit for receiving said output signal of said detector means and for generating a control signal; and,



adjustable beam deflecting means arranged in the region of said input end of said articulated optical system for adjusting the position of said laser beam in response to said control signal.

4,707,597

METHOD AND APPARATUS FOR ACOUSTIC SUPERVISION OF ADJUSTMENT OPERATIONS AT OPTICAL DEVICES

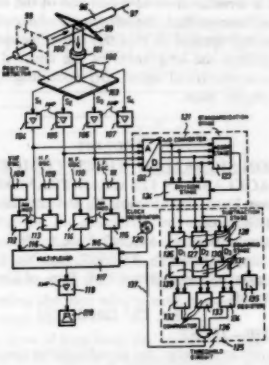
Joerg Schulz-Hennig, Heikendorf, Fed. Rep. of Germany, and Horst Sievers, Preetz, both of, assignors to Ing. Rudolf Hell GmbH, Fed. Rep. of Germany

Filed Jun. 11, 1985, Ser. No. 743,370

Claims priority, application European Pat. Off., Jun. 18, 1984, 84 106944.6

Int. Cl.[4] G01B *11/26*

U.S. Cl. 250—209 **15 Claims**



1. A method for acoustic supervision of positional adjustment of an optical axis of a light bundle to a nominal point, comprising steps of:

dividing a measuring surface lying in a light path of the light bundle into sectors so that apexes of centering angles of the sectors lie at the nominal point;

generating electrical measuring signals derived from each of the individual sectors of the measuring surface by optoelectronically measuring portions of the light bundle incident into said sectors;

generating an audible oscillation signal for each of the sectors;

varying for all of the oscillation signals one of the parameters selected from the group consisting of frequency, amplitude, keying frequency, and pulse duty factor;

said one parameter being differently varied for each oscillation signal and corresponding sector so it uniquely identifies its respective sector;

varying another parameter for each of the oscillation signals, said another parameter being selected from said same group but being other than said one parameter, said another parameter varying in correspondence with an amplitude of the electrical measuring signals generated by the portion of the light bundle in the corresonding sector, said one parameter of the oscillation signal being indicative of the individual sectors and said second parameter being indicative of a positional deviation of the optical axis from said nominal point during adjustment;

forming differential signals D from said oscillation signals of at least two different sectors;

comparing the differential signals D to a given limit value D_g; and

if the limit value D_g is crossed, providing an audible indication thereof.

4,707,598

METHOD AND APPARATUS FOR MONITORING SHEETS FOR OVERLAPPING

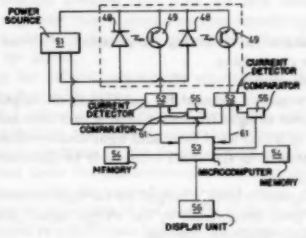
Michel R. Croset; Martin Lane, both of Hampshire; Roy E. Winchester, W. Sussex, and David R. Worsley, Hampshire, all of England, assignors to De La Rue Systems Limited, London, England

Continuation-in-part of Ser. No. 625,786, Jun. 28, 1984, Pat. No. 4,650,991. This application Jun. 28, 1985, Ser. No. 749,841

Claims priority, application United Kingdom, Jul. 1, 1983, 8317896; Jul. 26, 1983, 8320149

Int. Cl.[4] G01N *9/04*; B65H *7/12*

U.S. Cl. 250—223 R **12 Claims**



1. A method of monitoring the passage of sheets past at least one sheet sensing assembly of a sheet feeding apparatus, said at least one sensing assembly generating an output signal whose level varies in accordance with a characteristic of said sheets, the method comprising, for said at least one sensing assembly,

setting a single sheet output signal threshold at a level which will be passed by said output signal generated by said sensing assembly when a sheet passes said sensing assembly;

monitoring said output signal at least when it passes said threshold;

presetting a first threshold spaced by a predetermined amount from a datum output signal level achieved when no sheet is sensed,

said predetermined amount being such that said first threshold is not passed as a result of random noise variations in said output signal but is passed during the passage past said sensing assembly of all sheets which it is desired to monitor;

monitoring the size of said output signal relative to said datum level when said output signal first passes said first threshold corresponding to the passage of a first sheet;

generating said single sheet threshold from said monitored size; and

thereafter sensing when said output signal passes said thresholds.

4,707,599

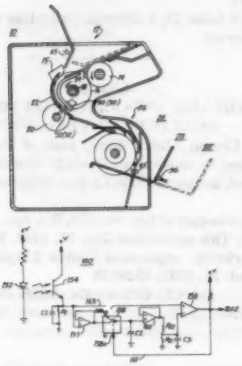
METHOD AND APPARATUS FOR COUNTING SHEETS WHICH MAY BE FED IN SKEWED AND/OR OVERLAPPING FASHION

William Sherman, III, Medford; Francis C. Larkin, Trenton, both of N.J., and Stephen J. Horvath, Bensalem, Pa., assignors to Brandt, Incorporated, Bensalem, Pa.

Division of Ser. No. 440,584, Nov. 10, 1982, Pat. No. 4,608,704. This application Mar. 17, 1986, Ser. No. 840,961

Int. Cl.[4] G01N *9/04*; G06M *7/00*

U.S. Cl. 250—223 R **6 Claims**



1. Apparatus for detecting the presence of sheets in a sheet receptacle comprising:

a light source;

a light sensitive element for generating an output signal in response to light from said source, said element receiving light of a first level from said light source when no sheets are present in the sheet receptacle to generate a second output;

a first capacitor being charged by the light sensitive element to a level determined by the output signal generated by the light sensitive element;

a reference circuit including a second capacitor and resistance means for limiting the discharge rate of the second capacitor;

switch means for selectively coupling the output signal of the light sensitive element to the first capacitor;

amplifier means having an input impedance of the order of a megohm for coupling the level across the first capacitor to the second capacitor through said resistance means to charge said second capacitor to a certain level;

comparator means for comparing the output signal of said light sensitive element with the level across said second capacitor for generating a first control output to close said switch means when the level of the output of said light sensitive element is higher than the level across said second capacitor and for generating a second control output when the level of the output of said light sensitive element is lower than the level across the second capacitor to limit discharge of the first capacitor through said high input impedance amplifier means, whereby the first output of the comparator represents the absence of sheets in the receptacle and the second output of the comparator represents the presence of at least one sheet in the receptacle.

4,707,600

MARK SENSOR DEVICE WITH ONE-DIMENSIONAL IMAGE POSITION SENSOR

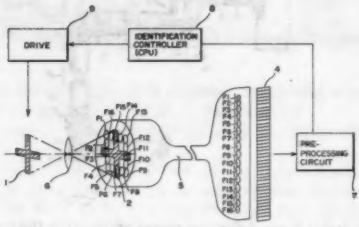
Tadashi Nakao, Nara, and Toshitsugu Sawai, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 711,001, Mar. 12, 1985, abandoned. This application Mar. 2, 1987, Ser. No. 20,241

Claims priority, application Japan, Mar. 13, 1984, 59-48528

Int. Cl.[4] H01J *5/16*, *40/14*

U.S. Cl. 250—227 **4 Claims**



1. A mark sensor device for sensing the position of an optical image of an object mark of a predetermined shape with an image sensor and converting said sensed position into an electrical signal, comprising:

an image data transmitter composed of a plurality of optical fibers in a bundle being interposed between said object mark and said image sensor;

the ends of said plurality of optical fibers on one end of said image data transmitter being arranged in a predetermined two-dimensional geometrical shape;

the ends of said plurality of optical fibers on the other end of said image data transmitter being arranged along a line;

said image sensor being a one-dimensional image sensor correspondingly aligned with said linearly aligned ends of the plurality of optical fibers;

whereby light containing the optical image of said object mark is irradiated on said one end of the image data transmitter, transmitted therethrough and emitted from said other end thereof so that the one-dimensional image sensor detects the brightness of the emitted light, and produces an electrical signal corresponding to the position of said object mark.

4,707,601

POSITION SIGNALLER WHICH COMPENSATES FOR BACKLASH IN ITS GEAR TRANSMISSION

Hans-Dieter Layh, Zachersweg 17, D-7121 Gemmrigheim, Fed. Rep. of Germany

Continuation of Ser. No. 697,347, Feb. 1, 1985, abandoned. This application Feb. 11, 1987, Ser. No. 13,414

Claims priority, application Fed. Rep. of Germany, Feb. 22, 1984, 3406336

Int. Cl.[4] G01D *5/34*

U.S. Cl. 250—231 SE **22 Claims**

1. A position signaller for an adjustable machine part whose position is movable by positioning drive means so as to have an initial direction of movement, the position signaller comprising:

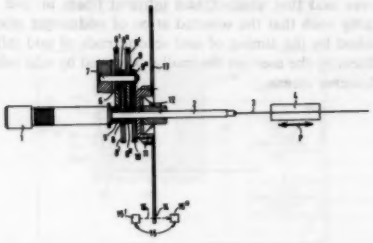
a signaller part;

a transmitting element drivably coupled with one of said drive means and the adjustable machine part so as to be driven at a speed;

a force transmitting connection drivably coupling said signaller part with said transmitting element; and

a step-down gear mechanism connecting said signaller part to said transmitting element so as to slow down said signaller part to a reduced speed relative to said transmitting element during which said step-down gear mechanism

does not exhibit play, said force transmitting connection being formed to slip while said step-down transmission mechanism drives said signaller part at said reduced speed, said step-down gear mechanism being arranged to exhibit



play as soon as said initial direction of movement of said adjustable machine part changes and during which said signaller part is drivable via said force transmitting connection at a non-reduced speed relative to said speed of transmitting element.

4,707,602

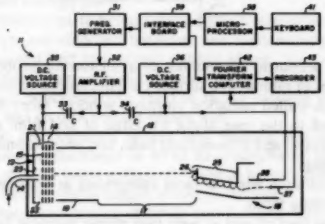
FOURIER TRANSFORM TIME OF FLIGHT MASS SPECTROMETER

Fritz J. Knorr, Mountain View, Calif., assignor to Surface Science Laboratories, Inc., Mountain View, Calif.

Continuation-in-part of Ser. No. 724,514, Apr. 8, 1985, Pat. No. 4,633,083. This application Nov. 25, 1985, Ser. No. 801,207

Int. Cl.[4] B01D *59/44*

U.S. Cl. 250—282 **8 Claims**



1. In a method for operating a time of flight mass spectrometer of the type having an evacuable envelope containing a source of ions for ionizing a substance under analysis, means for extracting and accelerating the ions to produce a flow of ions from the source into an ion drift region and thence into a detector for detecting the ions which have passed through the drift region, the steps of:

modulating the flow of ions from the ion source and through the evacuated drift region at subatmospheric pressure to the detector at a certain modulation frequency;

changing the frequency of the modulation frequency;

detecting the flow of ions into the detector as a function of the modulation frequency to obtain an ion mass interferogram output consisting of detected ion current as a function of modulation frequency in the frequency domain; and

transforming the ion mass interferogram output in the frequency domain into the time domain to obtain a time domain mass spectrum output of the substance under analysis comprising detected ion current as a function of flight time through the drift region to the detector.

4,707,603

PROCEDURE FOR MEASURING CONTENTS OF HYDROCARBONS IN LIQUIDS CONTAINING SUCH

Pentti Miemelä, Jäälli, and Jarl Jaatinen, Helsinki, both of Finland, assignors to Sahkoliikkeiden Oy, Finland

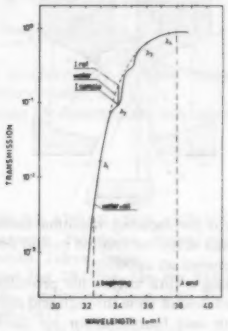
PCT No. PCT/FI85/00028, § 371 Date Jan. 27, 1985, § 102(e) Date Jan. 27, 1985, PCT Pub. No. WO85/04478, PCT Pub. Date Oct. 10, 1985

PCT Filed Mar. 22, 1985, Ser. No. 817,749

Claims priority, application Finland, Mar. 23, 1984, 841183

Int. Cl.[4] G01N *21/35*

U.S. Cl. 250—339 **13 Claims**



1. Method for measuring hydrocarbon content in liquid containing the same, comprising the steps of

conducting the liquid to be measured into a transparent measuring cuvette,

irradiating the cuvette with infrared radiation of of wavelengths within a first wide wavelength range whereby the liquid absorbs infrared rays over the first wide range which is greater than a second narrow wavelength range over which the hydrocarbon affects the infrared absorption of the liquid,

measuring the infrared absorption spectrum of the liquid over the first wide range,

determining infrared absorption of the liquid without the hydrocarbon in the second range by extrapolating the absorption spectrum for the liquid without the hydrocarbon based upon the measurement of infrared absorption spectrum outside the second wavelength range, and

determining an indication of the content of the hydrocarbon in the liquid as a difference between the measured infrared absorption spectrum of the liquid with the hydrocarbon and the extrapolated infrared absorption spectrum of the liquid without the hydrocarbon in the second wavelength range.

4,707,604

CEILING MOUNTABLE PASSIVE INFRARED INTRUSION DETECTION SYSTEM

John K. Guscott, Lynnfield, Mass., assignor to ADT, Inc., Parsippany, N.J.

Filed Oct. 23, 1985, Ser. No. 790,457

Int. Cl.[4] G01J *1/00*; G08B *13/18*

U.S. Cl. 250—342 **21 Claims**

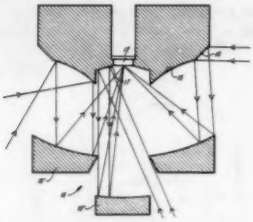
1. A ceiling mountable passive infrared intrusion system for detecting an intruder when present on the floor of an area to be protected and when present between the ceiling and the floor of the area to be protected, comprising:

a first mirror for focusing radiation incident thereon at a focus;

means including a second miror for providing a curtain like first field of view that has a nominal range, a comparatively narrow azimuthal extent, and a comparatively wide

elevational extent, and cooperative with the first mirror for directing the radiation present in the first field of view onto the focus;

means including a third mirror for providing a generally disc-like second field of view that is generally transverse the first field of view that has a nominal range, a comparatively narrow elevational extent, and a comparatively wide azimuthal extent, and cooperative with the first mirror for directing the radiation present in the second field of view onto the focus;



a fourth mirror for focusing radiation incident thereon at said focus and in spaced relation to said first mirror defining therebetween an opening;

means including a fifth mirror for providing a generally-conical third field of view through said opening and cooperative with said fourth mirror for directing radiation present in the third field of view onto said focus; and

an infrared detector positioned at said focus of the first and fourth mirros and along the optical axis thereof and operative in response to the radiation focused thereat to provide an electrical signal representative of intruder presence.

4,707,605

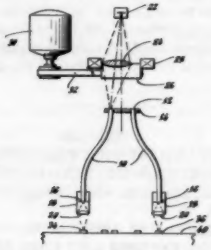
METHOD AND APPARATUS FOR THERMAL EXAMINATION OF A TARGET BY SELECTIVE SAMPLING

Robert W. Astheimer, Westport, and William J. Kelly, Bridgeport, both of Conn., assignors to Barnes Engineering Company, Shelton, Conn.

Filed May 7, 1986, Ser. No. 860,512

Int. Cl.[4] G01N *21/62*; G02B *6/00*

U.S. Cl. 250—347 **5 Claims**



1. Apparatus for the selective thermal examination of a target with the areas of examination being selectable by the user comprising:

an infrared detector means,

a plurality of infrared fibers having first and second ends,

said second ends being movable and directed by the user to selective areas of a target which are desired to be thermally examined by said infrared detector means,

means for mounting said first ends of said infrared fibers in a fixed array suitable for being scanned by said infrared detector means, and

the individual second ends of said fibers are aimed and directed by the user at the areas of the target to be examined,

optical scan means for scanning said infrared detector means over said first ends of said infrared fibers in said fixed array such that the selected areas of said target as established by the aiming of said second ends of said infrared fibers by the user are thermally examined by said infrared detector means.

4,707,606

PROPORTIONAL COUNTER FOR DETECTING SURFACE CONTAMINATIONS

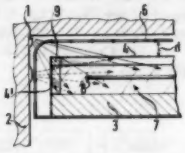
Manfred Keller, Jülich, Fed. Rep. of Germany, assignor to Kernforschungsanlage Jülich Gesellschaft mit beschränkter Haftung, Jülich, Fed. Rep. of Germany

Filed Oct. 5, 1984, Ser. No. 658,114

Claims priority, application Fed. Rep. of Germany, Oct. 8, 1983, 3336666; Nov. 5, 1983, 3340072

Int. Cl.[4] G01T *1/18*

U.S. Cl. 250—374 **9 Claims**



1. A proportional counter as a measuring probe for the detection of radioactive surface contaminations having: a case with thin-walled radiation entrance window faces made of a film fixed to the case along the edge of said film; a contact safety device; and a connecting base, said proportional counter comprising:

said entrance window faces comprising at least two planar window faces;

at least two of said at least two planar window faces comprising said film and having the faces thereof disposed at an angle other than 180° with respect to one another; and

said case comprising a framework connected to said base, said framework including at least one elongated frame member arranged to form the edges of said at least two planar window faces and making contact with said window film being mounted in contact with said at least one elongated frame member, said at least one elongated frame member having a width dimension from the edge of one of said at least two planar window faces being disposed on a first side of said at least one elongated frame member to the edge of another of said at least two planar window faces being disposed on a side of said at least one elongated frame member opposite its first side, said case enclosing a radiation sensitive volume having counting elements disposed therein; as well as

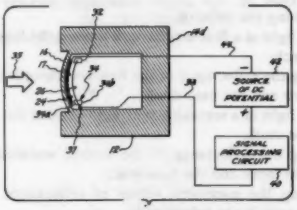
said contact safety device being disposed to provide, in use, a spacing (d) of at least double said width dimension of said at least one elongated frame member between said at least two planar window faces and the surface to be checked.

4,707,607

HIGH RESOLUTION X-RAY DETECTOR

Nathan R. Whetten, Ballston Lake, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 14, 1986, Ser. No. 839,480
Int. Cl.[4] H01J 47/02; G01T 1/185
U.S. Cl. 250—385 23 Claims



1. A high resolution, computerized tomography x-ray detector, comprising:

a housing;

an x-ray permeable window disposed in a front wall of said housing;

a first voltage plate in the form of a sheet of electrically conductive material disposed proximate the surface of said window facing into said housing, said first voltage plate being substantially transparent to x-ray energy;

a collector plate including an array of discrete, electrically conductive collector plate elements, said collector plate comprising a sheet of nonconductive material on which said conductive collector plate elements are disposed as substantially parallel collector stripes, each of each collector stripes including means for making separate electrical connection to a signal processing circuit;

said first voltage plate and said collector plate mounted in substantially parallel, opposed relation within said housing in locations behind said window;

a second voltage plate;

said collector plate being substantially transparent to x-ray energy and disposed between, and equidistantly spaced from, said first and second voltage plates;

said collector stripes being disposed on the opposite surfaces of said nonconductive sheet in facing relation with said first and second voltage plates; and

a noble gas contained within said housing and having a pressure in the range of 40 to 80 atmospheres, said pressure thereby being sufficiently high as to limit the characteristic absorption length of x-rays therein;

such that x-ray energy entering said housing through said window in the presence of an electric field between said voltage plate and said collector plate elements interacts with said gas to produce electrons and positive ions which propagate between said voltage plate and the most proximate of said collector plate elements.

4,707,608

KINESTATIC CHARGE DETECTION USING SYNCHRONOUS DISPLACEMENT OF DETECTING DEVICE

Frank A. DiBianca, Chapel Hill, N.C., assignor to University of North Carolina at Chapel Hill, Chapel Hill, N.C.

Filed Apr. 10, 1985, Ser. No. 721,727
Int. Cl.[4] G01T 1/185; H01J 47/00
U.S. Cl. 250—389 114 Claims

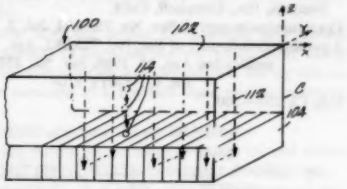
1. An apparatus for detecting propagating energy comprising:

means for defining a space upon which propagating energy is incident;

medium means, disposed within said space, for interacting with said incident energy to produce secondary energy;

first position-changing means for non-randomly changing the position of the secondary energy within said space relative to said medium means;

second position-changing means for changing the position of



said space synchronously with the change of position of said secondary energy; and

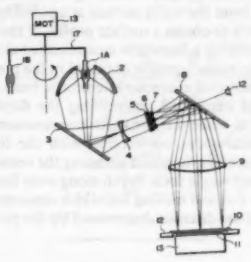
detecting means for detecting the secondary energy in said space.

4,707,609

EXPOSURE APPARATUS AND METHOD

Yoshinori Shimamura, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 29, 1986, Ser. No. 823,732
Claims priority, application Japan, Jan. 31, 1985, 60-15476; Jan. 31, 1985, 60-15477
Int. Cl.[4] G21G 5/00
U.S. Cl. 250—492.1 7 Claims



1. An exposure apparatus for exposing a first object to a radiation energy passed through a second object, said apparatus comprising:

means for holding the first object;

means for holding the second object;

first radiation energy source means for producing a radiation energy to irradiate the second object with the radiation energy, so that the first object is exposed to the radiation energy passed through the second object;

at least one additional radiation energy source means kept in reserve for possible use in place of said first radiation energy source;

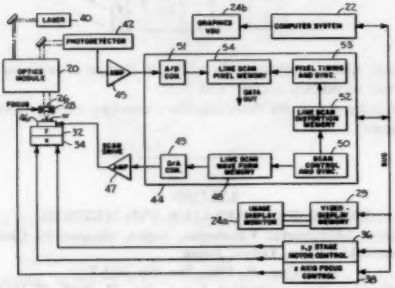
instructing means for producing an instruction signal to instruct exchange of said first radiation energy source means and said additional radiation energy source means; and

exchanging means operative, in response to the instruction signal from said instructing means, to energize said additional radiation energy source means and, after a predetermined time has elapsed, to displace said first radiation energy source means from a first position for irradiating the second object to a second position, and to displace said additional radiation energy source means to the first position in its energized state.

4,707,610
METHOD AND APPARATUS FOR MEASURING SURFACE PROFILES

James T. Lindow, Saratoga; Simon D. Bennett, and Ian R. Smith, both of Los Gatos, all of Calif., assignors to SiScan Systems, Inc., Campbell, Calif.

Continuation-in-part of Ser. No. 752,160, Jul. 3, 1985, which is a continuation-in-part of Ser. No. 725,082, Apr. 19, 1985. This application Apr. 11, 1986, Ser. No. 850,983
Int. Cl.[4] G01V 9/04
U.S. Cl. 250—560 23 Claims

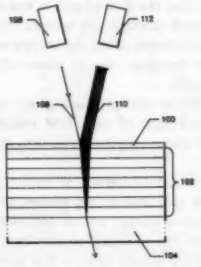


1. A method of making linewidth measurements within a given surface area on a semiconductor wafer or the like comprising scanning along an initial scan line in said area with a focused beam of energy and measuring a characteristic of the reflected beam from the wafer surface at a plurality of different focal depth levels to obtain a surface profile of the wafer along said scan line, making a linewidth measurement along said scan line based on the surface profile obtained in the preceding step, selecting the measured characteristic profile from a single scan at a single focal depth and determining the depth offset distance at which to make the linewidth measurement in order to have such measurement correspond with the linewidth obtained in the preceding step, and scanning the remainder of said wafer area at said single focal depth along scan lines parallel to said initial scan line and making linewidth measurements utilizing the depth offset distance determined by the preceding step.

4,707,611
INCREMENTAL MONITORING OF THIN FILMS

William H. Southwell, Thousand Oaks, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Dec. 8, 1986, Ser. No. 939,499
Int. Cl.[4] G01B 11/02
U.S. Cl. 250—560 12 Claims



1. A method of determing the thickness t and refractive index n of an incremental thin film layer deposited on a base stack of layers, the base stack having a known characteristic matrix M of the form

$$M = \begin{pmatrix} M_{11} & iM_{12} \\ iM_{21} & M_{22} \end{pmatrix},$$

comprising the steps of:

directing light at a first wavelength toward the layer and the base stack;

measuring the reflectance of the first wavelength light from the layer and the base stack;

directing light at a second wavelength toward the layer and the base stack;

measuring the reflectance of the second wavelength light from the layer and the base stack;

substituting the measured values of reflectance for each wavelength in the relationship

$$\text{reflectance} = \frac{(B_1 - C_1)^2 + (B_2 - C_2)^2}{(B_1 + C_1)^2 + (B_2 + C_2)^2}$$

where

$B_1 = M_{11} \text{ Cos } \phi - (M_{21}/n) \text{ Sin } \phi$,

$B_2 = N_s(M_{12} \text{ Cos } \phi + (M_{22}/n) \text{ Sin } \phi)$,

$C_1 = N_s(M_{22} \text{ Cos } \phi - M_{12} n \text{ Sin } \phi)$,

$C_2 = M_{11} n \text{ Sin } \phi + M_{21} \text{ Cos } \phi$,

$\phi = 2\pi nt/\lambda$,

N_s is the refractive index of the substrate, and

λ is the first wavelength for the first reflectance measurement and the second wavelength for the second reflectance measurement;

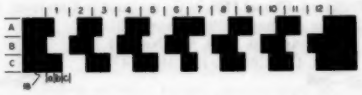
and

determining the thickness t and the refractive index n by solving the two reflectance equations.

4,707,612
BINARY CODING SYSTEM

Robert J. Martin, Lynchburg, Va., assignor to Blue Bell, Inc., Greensboro, N.C.

Filed Nov. 27, 1985, Ser. No. 802,310
Int. Cl.[4] G06K 7/14, 19/06
U.S. Cl. 250—568 4 Claims



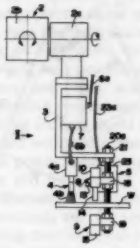
4. A multi-channel binary code including a plurality of indicating means in each channel, the binary reading of said code beng a function of the order in which said indicating means change logic states along said channels relative to each other as relative movement between the indicating means and a reading means occurs.

4,707,613

INSPECTING DEVICE FOR A THIN FILM COATING MATERIAL WITH APPLICATOR-FOLLOWING DETECTOR

Tsuyoshi Nagata, and Katsuto Fujita, both of Takatsuki, Japan, assignors to Sunstar Engineering Inc., Osaka, Japan

Filed Apr. 8, 1986, Ser. No. 849,420
Claims priority, application Japan, Apr. 18, 1985, 60-83249
Int. Cl.[4] G01N *21/88*
U.S. Cl. 250—572 **4 Claims**



1. An inspecting device for inspecting a thin film coating material being applied in a predetermined trace to a material being treated, said inspecting device comprising:

a projector and a photoreceptor disposed across said material being treated;

a manipulator for enabling relative movement of the projector and the photoreceptor along said material being treated;

an electric circuit part for producing a control signal when output of said photoreceptor exceeds a specified value which is indicative of a defect in said thin film coating material applied to said material being treated; and

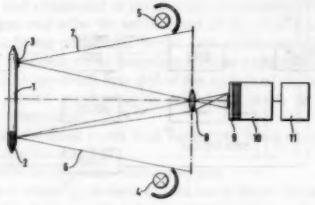
wherein said manipulator is provided with coating means for applying the coating material to said material being treated, and said projector and photoreceptor follow behind said coating means in the direction in which said coating means is moving.

4,707,614

SELF-CONTAINED PORTABLE PHOTOELECTRIC GAS MEASURING AND WARNING APPARATUS

Hans Matthiessen, Gross Parin, and Jörg Winkler, Stockelsdorf, both of Fed. Rep. of Germany, assignors to Drägerwerk Aktiengesellschaft, Lübeck, Fed. Rep. of Germany

Filed Jan. 15, 1986, Ser. No. 819,140
Claims priority, application Fed. Rep. of Germany, Jan. 15, 1985, 3501093
Int. Cl.[4] G01N *21/49*
U.S. Cl. 250—576 **8 Claims**



1. A self-contained portable gas measuring and warning apparatus comprising:

a housing;

a testing tube mounted in a fixed position in said housing for conducting the gas therethrough the presence of which is to be detected;

gas-flow inducing means mounted in said housing for passing the gas through said testing tube;

light-source means for illuminating the entire length of said testing tube;

a photoelectric scanning device for scanning said testing tube at a plurality of locations one next to the other along the direction of flow of the gas through said testing tube to detect the presence of a reaction zone migrating therethrough;

said photoelectric scanning device including:

optical imaging means for forming an image of said entire length of said testing tube including said reaction zone;

a light-sensitive diode array of like sensors for receiving said image on all of said sensors and for detecting the portion of said image corresponding to said reaction zone; and,

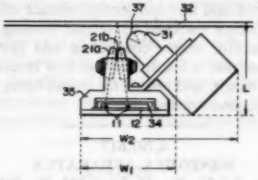
evaluation circuit means connected to said light-sensitive array so as to be controlled by the number of said sensors detecting said portion of said image to give a measurement signal.

4,707,615

SOLID STATE IMAGE SENSOR

Yasuo Hosaka, Tokyo, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Japan

Continuation of Ser. No. 483,255, Apr. 8, 1983, abandoned. This application Mar. 7, 1986, Ser. No. 838,202
Claims priority, application Japan, Apr. 13, 1982, 57-60366
Int. Cl.[4] H01J *3/14*
U.S. Cl. 250—578 **26 Claims**



1. A high resolution solid state image sensor for convering a line of picture elements from a document into electrical signals representive of the picture elements, said solid state image sensor comprising:

a source of light to illuminate the line;

a plurality of rows of CCD arrays, the combined length of said arrays being greater than the width of the document, each of said arrays having a length less than the width of the document and including a plurality of photosensors to convert incident light to electrical signals, said arrays of each row being staggered relative to said arrays of adjacent rows so that end portions of said arrays in different rows overlap to produce redundant electrical signals;

an optical system between said line and each of said rows to transmit reflected light from the line to said arrays, said optical system projecting onto said arrays an unreversed and unmagnified light image of the line of picture elements; and

transport means connected to said arrays for transporting the electrical signals to an output terminal;

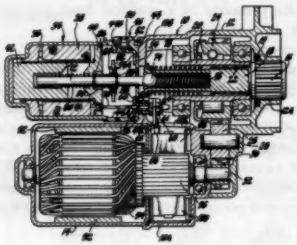
said arrays being arranged among said rows in such a manner that an image of each picture element is formed on at least one array, and the image of each picture element is projected onto at least two adjacent photosensors in the same array.

4,707,616

ELECTRIC ENGINE STARTER

Douglas R. Ogle, Indianapolis; Daniel D. Richey, New Castle, and James L. Whitehurst, Hartford City, all of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 17, 1987, Ser. No. 26,991
Int. Cl.[4] F02N *11/08*
U.S. Cl. 290—48 **4 Claims**



1. An electric starter for cranking an internal combustion engine comprising, first housing means, a pinion for said starter, said first housing means containing pinion driving means, a solenoid having an actuating coil and a shiftable plunger, said solenoid secured to said first housing means, said solenoid having a first terminal that is adapted to be connected to a source of direct voltage, first switch contact means disposed within said solenoid connected to said first terminal, said solenoid having a second terminal that has second switch contact means disposed within said solenoid, said second terminal having a portion thereof located within said first housing means, a contactor shiftable by movement of said plunger into engagement with said first and second contact means, an electric cranking motor enclosed by second housing means, and electrical connector means connecting said portion of said second terminal that is located in said first housing means to said cranking motor, said connector means being enclosed by said first and second housing means.

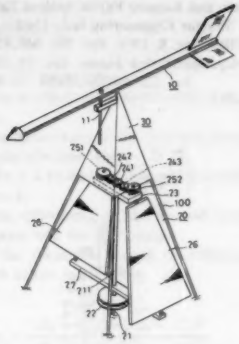
4,707,617

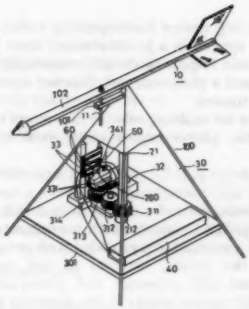
WINDMILL APPARATUS

Muh-Juh Chen, 5-3 Fl., No. 11, Lane 322, Wu-Fel St., and Li-Ming Hwang, both of Tainan, Taiwan, assignors to Muh-Juh Chen, Tainan, Taiwan

Filed Dec. 23, 1986, Ser. No. 945,676
Int. Cl.[4] F03D *7/06*
U.S. Cl. 290—55 **7 Claims**

1. A windmill apparatus comprising:
a frame body structure adapted to be positioned on a flat top surface of a construction such as a building;
a main shaft vertically fixed in a middle position of said frame body structure;
a first main-shaft sleeve rotatably coupled with a lower portion of said main shaft for being driven to rotate around said main shaft;
a belt pulley fixedly connected at a lower end of said first main-shaft sleeve for providing a driving froce therefrom along with said first main-shaft sleeve;
a rotating means having a revolving arrangement vertically disposed therein rotatably installed around said first main-shaft sleeve within a lower open portion of said frame body structure for being driven to rotate by wind along with said first main-shaft sleeve;
a second main-shaft sleeve with a first gear fixed at a lower end thereof movably connected at an upper portion of said main shaft for providing gear transmission therefrom;
a direction control means installed within an upper closed portion of said frame body structure and rotatably connected to said rotating means through said second main-shaft sleeve for automatically adjusting said revolving arrangement according to wind direction; and
a wind direction indicating means horizontally disposed on





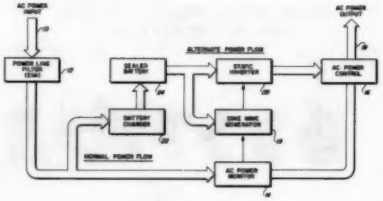
top of said frame body structure and rotatably connected to said direction control means so as to relay wind direction change thereto; whereby, wind force can be effectively utilized with a simplified structure.

4,707,618

SWITCH PROTECTION MECHANISM

Richard M. Haas, 3452 N. 47th St., Phoenix, Ariz. 85018

Filed Jun. 2, 1986, Ser. No. 869,620
Int. Cl.[4] H02J *9/00*
U.S. Cl. 307—64 **18 Claims**



1. A system for maintaining continuous flow of power to a load including in combination:
output load terminals;
a primary source of alternating current signal power;
first phase shift means;

normally closed switch means;

means for connecting said normally closed switch means and said first phase shift means between said primary source of alternating current signal power and said load terminals;

an alternate source of alternating current signal power connected to said output load terminals, said alternate source being inoperative when said switch means is closed and being operative when said switch means is open;

control means having a synchronizing input coupled with said primary source of alternating current signal power and an output connected with said alternate source of alternating current signal power, said control means including continuously operative means for producing an alternating current control signal and for applying said control signal to said alternate source of alternating current signal power for controlling the phase and frequency of operation thereof, said control signal being synchronized in frequency and phase with the frequency and phase of the alternating current signal from said primary source of alternating current signal power; and

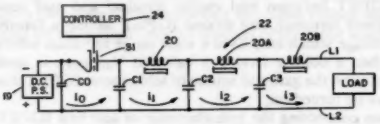
sensing means coupled with said primary source of alternating current signal power for sensing the voltage level of signals therefrom and for opening said normally closed switch means to disconnect said primary source of power from said load terminals and for rendering said alternate source of alternating current signal power operable whenever the voltage level of signals from said primary source of alternating current signal power is outside a predetermined voltage range.

4,707,619

SATURABLE INDUCTOR SWITCH AND PULSE COMPRESSION POWER SUPPLY EMPLOYING THE SWITCH

Edmond Y. Chu, Carlsbad, and Vance I. Valencia, San Diego, both of Calif., assignors to Maxwell Laboratories, Inc., San Diego, Calif.

Filed Feb. 13, 1985, Ser. No. 701,079
Int. Cl.[4] G11C *13/02*
U.S. Cl. 307—106 **6 Claims**



1. A magnetic pulse compression power supply for supplying a high current, fast rise time power pulse to a load to which said power supply is connected by a first conductor and a second conductor, said power supply comprising:

a high voltage D.C. power source; and

a series of pulse compression stages interconnected between said power source and said load, each stage comprising a saturable inductor magnetic switch having a first end and a second end connected in series with the switches of the other stages and with the second end of the switch of the final stage being connected to the first conductor of the said load, each stage also including a shunt capacitor bank connected between the first end of the switch of that stage and the second conductor of said load, each of said switches comprising:

a plurality of spaced cores with each core being made of ferromagnetic material;

an insulative layer about each core; and

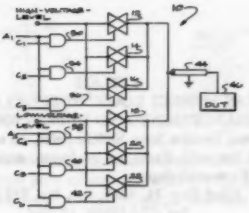
an electrical winding on each of said cores about its insulative layer, each winding having first and second ends and being electrically connected to its respective core intermediate its ends, the windings being connected in series in that the second end of a winding is directly connected to the first end of the next adjacent winding, all of said cores having substantially the same size and shape and all windings having substantially the same number of turns, all of said cores saturating substantially simultaneously, said cores being closely adjacent but not contiguous with a gap spacing each pair of closely adjacent cores so that a cooling medium can circulate between adjacent cores.

4,707,620

ADJUSTABLE IMPEDANCE DRIVER NETWORK

Steven K. Sullivan, and Christopher W. Branson, both of Beaverton, Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Jul. 22, 1986, Ser. No. 887,314
Int. Cl.[4] H03K *3/26, 17/687, 17/56*
U.S. Cl. 307—270 **7 Claims**



1. A driver circuit having a high voltage output state and a low voltage output state and having a variable output impedance comprising:

(a) a first plurality of transmission gates connected in parallel between a high voltage source and a transmission line;

(b) a second plurality of transmission gates connected between a low voltage source and said transmission line; and

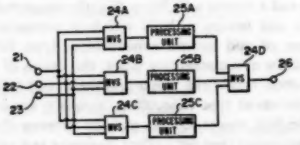
(c) logic circuit means for simultaneously selectively enabling various ones of said gates when either a high level or low level actuating signal is provided to one of said respective pluralities of transmission gates, thereby adjusting the impedance between said high or low voltage source, respectively, and said transmission line.

4,707,621

MULTIPLEX CONTROL APPARATUS HAVING MIDDLE VALUE SELECTION CIRCUIT

Setsuo Arita, Hitachi, and Takao Sato, Toukai, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Division of Ser. No. 6,512,000, Jul. 8, 1983, abandoned. This application Apr. 24, 1986, Ser. No. 855,455
Claims priority, application Japan, Jul. 13, 1982, 57-122561; Jan. 12, 1983, 58-2168
Int. Cl.[4] H03K *19/003, 19/007*
U.S. Cl. 307—441 **19 Claims**



1. In a multiplex control apparatus having a plurality of control means which receive independent input signals from an object to be controlled thereby and produce respective control output signals separately, and first middle value selection means which receives the control output signals from the

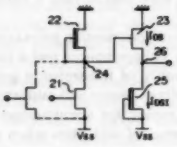
control means to output a final control signal to the object to be controlled by selecting the control output signal with the middle value among the signals from the control means, the improvement comprises plural sensor means for independently sensing an identical phenomenon of the object to be controlled to create detecting output signals respectively and a plurality of second middle value selection means corresponding in number to that of said control means, each of which is connected to receive the detecting output signals of said sensor means and selects the signal having the middle value among the received signals to provide an input signal to a corresponding one of said control means.

4,707,622

GAAS MESFET LOGIC BUFFERS USING ENHANCEMENT AND DEPLETION FETS

Hisoka Takao; Toshiro Sato; Seiichi Saito, all of Kawasaki, and Toshinari Hayashi, Tama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Dec. 31, 1985, Ser. No. 815,061
Int. Cl.[4] H03K *19/094*
U.S. Cl. 307—448 **4 Claims**



1. A logic circuit, for connection to first and second power sources, comprising:

an input;

an inverter circuit including:

a first enhancement type field effect transistor having a gate connected to the input and having a drain; and

a first depletion type field effect transistor having a gate and a source which are directly connected to the drain of said first enhancement type field effect transistor at a connecting point;

a source follower circuit including:

a second enhancement type field effect transistor having a gate which is connected to the connecting point of said first enhancement type field effect transistor and said first depletion type field effect transistor; and

a second depletion type field effect transistor having a gate and a source which are directly connected to each other and having a drain which is connected to the source of said second enhancement type field effect transistor at a connecting point, the drains of said first depletion type field effect transistor and said second enhancement type field effect transistor are connected to the first power source, and the sources of said first enhancement type field effect transistor and said second depletion type field effect transistor are connected to the second power source; and

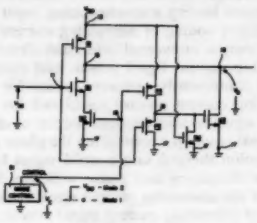
an output, formed at the connecting point of said second enhancement type field effect transistor and said second depletion type field effect transistor which forms said source follower circuit.

4,707,623

CMOS INPUT LEVEL SHIFTING BUFFER CIRCUIT

Otto H. Bismarck, Woodbridge Township, Middlesex County, N.J., assignor to RCA Corporation, Somerville, N.J.

Filed Jul. 29, 1986, Ser. No. 890,275
Int. Cl.[4] H03K *19/092, 17/16, 19/20*
U.S. Cl. 307—475 **9 Claims**



1. The combination comprising:

first and second power terminals for the application therebetween of an operating potential;

an input terminal for the application thereto of binary valued signals having a minimum high value (V_{INHMIN}) and having a maximum low value (V_{INLMAX}); and

an output terminal for producing thereat an output signal having one binary value in response to one value of the input signal and having the other binary value in response to another value of input signal;

first and second insulated-gate field-effect transistors (IGFETs), of first and second conductivity type, respectively; each IGFET having source and drain electrodes defining the ends of a conduction path and a control electrode for controlling the conductivity of its conduction path;

means connecting the conduction path of said first IGFET between said first power terminal and said output terminal;

means connecting the conduction path of said second IGFET between said output terminal and said second power terminal; said second IGFET having a threshold voltage which may have a wide range of values whereby when a voltage having a value of V_{INHMIN} is applied between the gate and source of said second IGFET it may not be turned-on;

means connecting the gate electrode of said first IGFET to said input terminal, said first IGFET being turned-on for input signals having one binary value and tending to be turned-off for input signals having the other binary value; and

level shift means connected between said input terminal and the gate electrode of said second IGFET responsive to the signal level at said input terminal, for level shifting the signal applied to said input terminal by an amount V_A, where V_A+V_{INHMIN} exceeds the threshold voltage of said second IGFET, and for applying the value of V_A plus the value of the signal applied to said input terminal to the gate electrode of said second IGFET whereby the turn-on of said second IGFET is ensured when said input signal applied to said input terminal has a value of V_{INHMIN}.

4,707,624

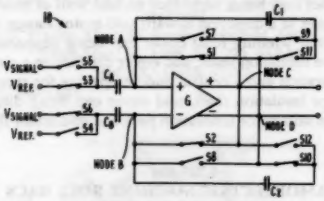
OFFSET CANCELLATION SCHEME FOR A DIFFERENTIAL RESET STABILIZED LATCH

Philip W. Yee, Mountain View, Calif., assignor to National Semiconductor Corp., Santa Clara, Calif.

Filed Sep. 10, 1986, Ser. No. 905,865
Int. Cl.[4] H03K *3/023*
U.S. Cl. 307—491 **4 Claims**

1. In a differential reset stabilize latch of the type which receives first and second latch inputs and which includes a

differential amplifier having first and second amplifier inputs connected to receive the first and second latch inputs, respectively, and corresponding first and second amplifier outputs, and which further includes a switched connection between the second amplifier output and the first amplifier input for selectively applying negative feedback to the first amplifier input, a switched connection between the first amplifier output and the first amplifier input for selectively applying positive feedback to the first amplifier input, a switched connection between the first amplifier output and the second amplifier input for selectively applying negative feedback to the second amplifier input, and a switched connection between the second amplifier output and the second amplifier input for selectively applying positive feedback to the second amplifier input, and wherein



the latch operates to provide a differential output voltage corresponding to the difference between first and second input voltages by applying negative feedback to the first and second amplifier inputs while the first input voltage is applied to the first latch input and the second input voltage is applied to the second latch input, the negative feedback then being removed from the first and second amplifier inputs and the input voltages reversed such that second input voltage is applied to the first latch input and the first input voltage is applied to the second latch input, followed by application of positive feedback to the first and second amplifier inputs,

the improvement comprising circuitry connected to the latch for substantially cancelling the offset voltage associated with the latch prior to reversal of the input voltages.

4,707,625

SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE FORMED WITH A CMOS CIRCUIT AND A BOATSTRAP CAPACITOR

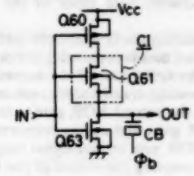
Kazumasa Yanagisawa, Kokubunji, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

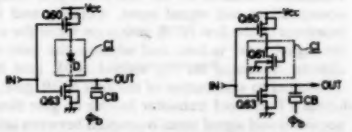
Filed Mar. 15, 1985, Ser. No. 712,141
Claims priority, application Japan, Mar. 26, 1984, 59-56027
Int. Cl.[4] H03K *4/58, 3/013, 3/353, 17/10*
U.S. Cl. 307—578 **37 Claims**

1. A semiconductor integrated circuit comprising:

a boosting capacitor connected between an output node and a boosting signal node for receiving a boosting signal;

a CMOS circuit comprising a first IGFET of a first conductivity type for charging said boosting capacitor and a second IGFET of a second conductivity type for discharging said boosting capacitor, wherein said first and second IGFETs are driven complementarily by an input signal; and





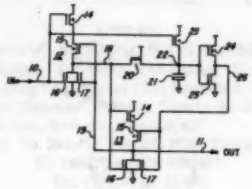
a reverse current inhibiting element connected in series with the source-drain path of said first IGFET for preventing the flow of a reverse current through said first IGFET.

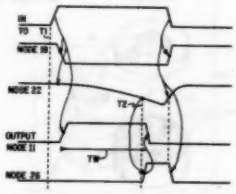
4,707,626

INTERNAL TIME-OUT CIRCUIT FOR CMOS DYNAMIC RAM

Shinji Inoue, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jul. 26, 1984, Ser. No. 634,897
Int. Cl.[4] H03K *3/284, 5/153, 19/094, 17/30*
U.S. Cl. 307—625 **4 Claims**





1. A time delay circuit comprising:

a signal input and a signal output;

a first CMOS NOR gate having first and second inputs and an output;

a second CMOS NOR gate having first and second inputs and an output;

RC delay circuit means having an input and an output;

said RC delay circuit means including inverter means having an input and an output;

said RC delay circuit means including resistance means

connected between said output of the first NOR gate and said input of the inverter means;

said RC delay circuit means including a capacitance connected between said input of the inverter means and ground;

means connecting the first input of the first NOR gate to said signal input, means connecting the output of the first NOR gate to the first input of the second NOR gate and the complementing transistor thereof, means connecting the output of the second NOR gate to the second input of the first NOR gate, and means connecting the output of the second NOR gate to said signal output;

and means coupling the output of the inverter means to the second input of the second NOR gate and the complementing transistor thereof;

wherein each of said first and second CMOS NOR gates includes a further separate P-channel transistor connecting the NOR gate to a voltage supply, the gate of said P-channel transistor for the first NOR gate being directly connected to said signal input, whereby said P-channel transistor of the first NOR gate is on when the voltage on the signal input is low; and wherein the gate of said P-channel transistor for the second NOR gate is directly connected to said output of the first NOR gate,

wherein a P-channel transistor having its gate directly connected to said signal input is coupled between said input of said inverter means and said voltage supply, wherby said input is charged to said voltage supply when said voltage on the signal input is low.

4,707,627

EXTERNAL ROTOR MOTOR WITH CONNECTING PLUG CONNECTION

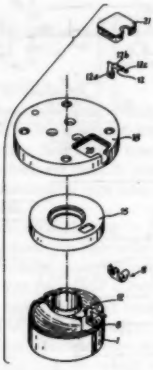
Dieter Best, Ingelfingen, Fed. Rep. of Germany, assignor to ebm Elektrobau Mufingen GmbH & Co., Fed. Rep. of Germany

Filed Dec. 12, 1985, Ser. No. 808,040

Claims priority, application Fed. Rep. of Germany, Dec. 29, 1984, 3447826

Int. Cl.[4] H02K *11/00*

U.S. Cl. 310—71 **8 Claims**



1. A stator comprising:

a stator lamination pack consisting of stacked up individual laminations;

stator windings;

said stator lamination pack being provided with grooves for receiving said stator windings;

a wall of insulation provided between said stator lamination pack and said stator windings;

a face insulation shaft extending in an axial direction from both opposing first and second faces of said stator lamination pack;

a motor flange being secured to said first face of said stator lamination pack, said motor flange having an opening therethrough;

plug connection means for connecting motor connecting leads to ends of said stator windings;

said plug connection means permitting said motor connecting leads to be connected to said ends of said stator windings through said opening in said motor flange after said motor flange has been secured to said first face of said stator lamination pack;

said plug connection means including contact lugs and connecting plugs, said connecting plugs receiving said contact lugs for connection therebetween;

said connecting plugs being secured to said motor connecting leads;

said contact lugs being secured to said ends of said stator windings;

said contact lugs being supported on said wall of insulation and facing in a direction toward said motor flange; and

an insulaitng winding head cover cap being supported on said face insulation shaft, said cover cap having a circular configuration and a central middle opening for receiving said face insulation shaft, said cover cap being disposed between said stator lamination pack and said motor flange.

4,707,628

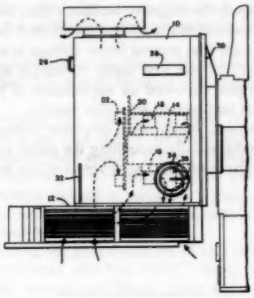
DYNAMOELECTRIC MACHINE ROLL BACK COLLECTOR HOUSING

Alan L. Obley, Altamonte Springs, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 14, 1986, Ser. No. 896,536

Int. Cl.[4] H02K *5/10*

U.S. Cl. 310—89 **4 Claims**



1. A dynamoelectric machine collector housing arrangement comprising:

a dynamoelectric machine rotor on a shaft, said shaft having an extended portion axially beyond said rotor;

a set of collector rings on said shaft extended portion;

a set of brushes located for electrical contact with said set of collector rings;

a housing enclosing said shaft extended portion, said collector rings, and said brushes, said housing having at an end thereof adjacent said rotor an interface for forming a breakable seal with a stationary structure;

means for air circulation through the interior of said housing to cool said collector rings and brushes and inherently producing a reduced air pressure in the interior of said housing as compared to that exterior of said housing;

said housing being equipped to allow it to be forced axially away from said interface during machine operation to perform inspections and adjustments of said collectors and brushes;

said housing having a portal valve in a surface thereof for opening prior to said housing being forced away from said

interface so said seal at said interface can be broken with moderate force,

said portal valve occupying an area of said enclosure surface that is less than that of said interface by at least about an order of magnitude,

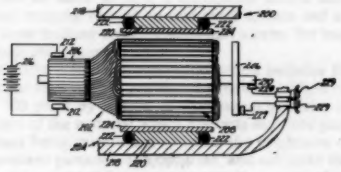
said portal valve comprising a pivot plate secured to a fixed pivot pin at an edge thereof, a closure mechanism substantially opposite said fixed pivot pin for securing said pivot plate substantially flush against said housing, and a handle for enabling manual rotation of said pivot plate about said pivot pin upon release of said closure mechanism, said pivot plate rotating in a plane substantially parallel to said surface of said housing.

4,707,629

ROTARY CONVERTER HAVING DUAL-WINDING ROTOR

George J. Wasko, Hwy. 86 South, Lakefield, Minn. 56150

Filed Mar. 24, 1986, Ser. No. 843,031
Int. Cl.[4] H02K *47/08*
U.S. Cl. 310—129 **16 Claims**



1. A rotor for use in a dynamo for converting direct current to alternating current comprising:

(a) an armature comprising an armature shaft, a commutator concentric with the shaft and an armature core concentric with the shaft and adjacent the commutator, the armature core having slots in its outer surface parallel to the axis of the shaft;

(b) concentric slip ring means fixedly associated with the armature shaft adjacent the armature core;

(c) a direct current winding electrically connected to the commutator and wound in a wave pattern through the armature core slots; and

(d) an alternating current winding electrically connected to the slip ring means and wound in a series of alternating clockwise and counterclockwise loops through the armature core slots, wherein the direct current winding comprises fifty wires, wound in a wave pattern through the armature core slots comprising, a first wire electrically connected at its first end to a first commutator bar, wound through a first slot and a sixth subsequent slot of the armature core, and electrically connected at its second end to a twenty-sixth subsequent commutator bar relative to the first commutator bar.

4,707,630

MAGNETIC COVER MEMBER FOR MAGNETIC POLES OF DC MOTOR

Tosio Tomite; Tatsuhiro Tani, and Hidemitsu Kobayashi, all of Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 6, 1986, Ser. No. 816,449
Claims priority, application Japan, Jan. 14, 1985, 60-3267
Int. Cl.[4] H02K *23/04*
U.S. Cl. 310—154 **6 Claims**

1. A permanent magnet type DC motor comprising:

(a) a yoke having a substantially cylindrical shape;

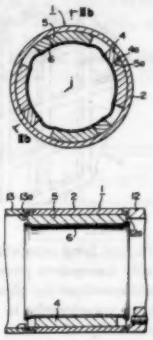
(b) a plurality of magnetic pole pairs of permanent magnets and auxiliary poles fixed to an inner circumferential surface of said yoke;

(c) a rotor adapted to be disposed to confront with said permanent magnets and auxiliary poles adjacent to and along said permanent magnets and auxiliary poles;

(d) an end bracket mechanically fixed to one end of said yoke;

(e) means for rotatably supporting said rotor, said rotatably supporting means being fixed to said end bracket;

(f) brush means fixed to said end bracket for supplying a DC current to an armature of said rotor; and



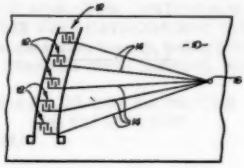
(g) a cylindrical magnetic cover member pressingly deformed and fixed to the inner circumferential surface of said plurality of magnetic pole pairs for holding said magnetic pole pairs in intimate contact with said yoke solely by the resilient force thereof, said magnetic cover member extending in a rotational axial direction of said rotor beyond a length of said magnetic pole pairs, and having at both ends an outer diameter larger than an inner diameter of said magnetic pole pairs.

4,707,631

ISOTROPIC ACOUSTIC WAVE SUBSTRATE

Robert B. Stokes, Torrance; Kuo-Hsiung Yen, Manhattan Beach; Kei-Fung Lau, Harbor City; Reynold S. Kagiwada, Los Angeles, and Michael J. Delaney, Lomita, all of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Division of Ser. No. 580,495, Feb. 15, 1984. This application Jul. 17, 1986, Ser. No. 886,457
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—313 A **1 Claim**



1. For use in a two-dimensional diffraction-effect or interference-effect surface acoustic wave (SAW) device, a structure comprising:

a substantially isotropic SAW substrate of X-propagating rotated Y-cut lithium niobate ($LiNbO_3$) having a Y rotation angle of approximately 121 degrees; and

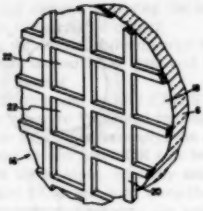
a plurality of electro-acoustic transducers disposed on a surface of said substrate at substantially different angles relative to the principal X propagating direction, thereby directly exploiting the diffraction or interference properties of acoustic waves.

4,707,632

ENERGY-EFFICIENT LAMP

Peter J. Walsh, Stirling, N.J., assignor to Duro-Test Corporation, N. Bergen, N.J.

Continuation of Ser. No. 445,214, Jan. 19, 1983, abandoned. This application Jan. 6, 1986, Ser. No. 816,387
Int. Cl.[4] H01J 5/08, 5/16, 61/35; H01K 1/32
U.S. Cl. 313—112 25 Claims



1. An energy-efficient lamp comprising:
an at least partially transparent envelope:
means within said envelope for generating electromagnetic radiation having wavelengths in a predetermined range consisting essentially of visible and infrared radiation upon the application of energy thereto;
waveguide means for substantially reflecting back to said electromagnetic radiation generating means portions of said electromagnetic radiation having wavelengths greater than a predetermined wavelength intermediate said visible and infrared radiation and for substantially transmitting therethrough electromagnetic radiation having wavelengths less than said predetermined wavelength, said waveguide means comprising a plurality of cells for guiding electromagnetic radiation therealong in a predetermined direction of propagation said cells having a predetermined cross-sectional shape perpendicular to said direction of propagation, each cell having a transmission opening with cross-sectional dimensions which are on the order of said predetermined wvelength, said cell opening essentially losslessly guiding radiation of wavelengths less than said predetermined wavelength and essentially losslessly reflecting radiation of wavelengths greater than said predetermined wavelength; and
a dielectric substance within said cell openings.

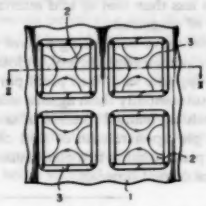
4,707,633

SHADOW MASK FOR ENHANCED RESOLUTION AND BRIGHTNESS IN COLOR CATHODE RAY TUBES

Toshiharu Hoshi, Shizuoka, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha', Japan

Filed Nov. 13, 1985, Ser. No. 797,697
Claims priority, application Japan, Nov. 14, 1984, 59-240243
Int. Cl.[4] H01J 29/07
U.S. Cl. 313—402 7 Claims

1. A shadow mask for color cathode ray tubes having mask apertures aligned in matrix orientation, wherein:
said shadow mask is made of a first material with a thermal expansion rate no greater than 2×10^{-6}/°C. for temperatures up to 40° C.;



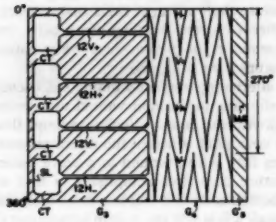
each of said mask apertures is surrounded by a magnet frame comprising a second material that is magnetized; and
the first and second materials are different from each other.

4,707,634

CATHODE RAY TUBE

Takehiro Kakizaki; Shoji Araki, and Shinichi Numata, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed May 10, 1985, Ser. No. 732,746
Claims priority, application Japan, May 15, 1984, 59-96797
Int. Cl.[4] H01J 29/62
U.S. Cl. 313—432 2 Claims



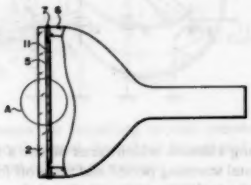
1. A cathode ray tube comprising:
(a) an envelope;
(b) an electron beam source positioned at one end of said envelope;
(c) a target positioned at another end of said envelope opposite to said electron beam source;
(d) a mesh electrode positioned opposite to said target; and
(e) an electrostatic lens means positioned between said electron beam source and said mesh electrode and including a cylindrical focussing electrode G'5, said means having a high-voltage electrode and a neighboring low-voltage electrode respectively positioned along said electron beam path to focus said electron beam, said low-voltage electrode being divided into four arrow or zig-zag patterns to deflect said electron beam and wherein one of the cylindrical focussing electrodes G'5 has been substantially shortened.

4,707,635

CATHODE RAY TUBE HAVING A FLUORESCENT LAYER WITH VARYING AMOUNTS OF SILICA

Norihiro Tateyama, Saitama; Kazuo Yamazaki, Aichi; Hiroshi Kato, Kanagawa, and Haruhito Teshima, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Mar. 26, 1986, Ser. No. 844,157
Claims priority, application Japan, Mar. 26, 1985, 60-61563
Int. Cl.[4] H01J 29/18, 29/28
U.S. Cl. 313—466 5 Claims



1. In a cathode ray tube having a face plate having an outer surface and an inner surface, a fluorescent screen including fluorescent material formed on said inner surface and a metal backing layer backing up said fluorescent screen, the improvement which comprises:

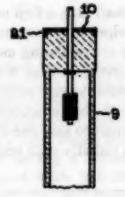
a fluorescent material composition which includes fluorescent particles and not less than 0.6 parts by weight of SiO_2 per 100 parts by weight of fluorescent particles in that portion of the material which contacts said face plate, the amount being insufficient to cause the brightness of said fluorescent particles to deteriorate, and not more than 0.3 parts by weight of SiO_2 per 100 parts by weight of fluorescent particles in that portion of said material which faces said metal backing layer.

4,707,636

HIGH PRESSURE SODIUM VAPOR LAMP WITH PCA ARC TUBE AND END CLOSURES

Vincent P. Morris, Willoughby, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 621,974, Jun. 18, 1984, abandoned.
This application Sep. 26, 1986, Ser. No. 912,692
Int. Cl.[4] H01J 61/36, 61/20
U.S. Cl. 313—625 9 Claims



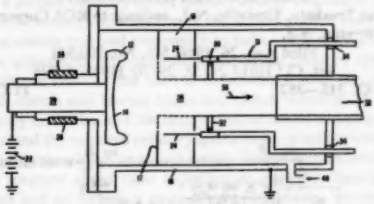
1. An improved high pressure sodium vapor lamp having a hollow tubular light-transmitting polycrystalline alumina arc tube construction formed with a cylindrical polycrystalline alumina tube body, a quantity of sodium-mercury amalgam, and thermonic electrodes sealed into the ends of said alumina arc tube body with polycrystalline alumina end closures of the same material composition wherein the improvement comprises assembling together said arc tube body in a unsintered condition with at least one of said end closures being in the shape of a flat partially sintered circular disc having a contour and shape permitting partial insertion into the internal opening of said arc tube body along with having a larger size projection located adjacent one major surface of said disc extending externally of said arc tube body, said assembled arc tube construction having said disc gravitationally suspended in said arc tube body and fully sintering together sufficiently, in the absence of sealing compound or frit, the assembled arc tube and disc to form a direct hermetic seal therebetween by shrinkage of the arc tube body uniformly around only the inserted portion of said disc without producing deformation of the arc tube during said sintering.

4,707,637

PLASMA-ANODE ELECTRON GUN

Robin J. Harvey, Thousand Oaks, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Mar. 24, 1986, Ser. No. 842,960
Int. Cl.[4] H01J 7/24; H05B 31/26
U.S. Cl. 315—111.81 25 Claims



1. A plasma-anode electron gun assembly comprising:

a cathode formed of a material that emits secondary electrons in a ratio to incident ions sufficiently high to provide a predetermined current requirement;

a combined anode and ion source electrode structure, said structure including a substantially ring-shaped hollow chamber having a radially inner surface which forms a passageway for secondary electrons emitted from said cathode;

means for generating an ion plasma in said ring-shaped hollow chamber;

means for biasing said cathode to a substantial negative potential with respect to said combined anode and ion source structure;

means for selectively releasing ions from said ring-shaped hollow chamber to impinge upon said cathode; and

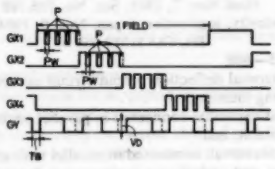
means for directing secondary electrons released from said cathode through said passageway in said ring-shaped hollow chamber.

4,707,638

LUMINANCE ADJUSTING SYSTEM FOR A FLAT MATRIX TYPE CATHODE-RAY TUBE

Zenichirou Hara, and Ichirou Iwatsuji, both of Nagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 27, 1987, Ser. No. 7,148
Int. Cl.[4] G09G 3/10
U.S. Cl. 315—169.3 4 Claims



1. A luminance adjusting system for a flat matrix CRT in which grid electrodes comprise a plurality of scanning elec-

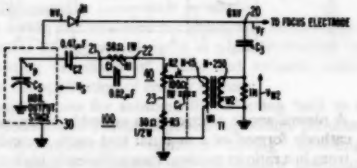
trodes and a plurality of data electrodes which are arranged to form a matrix structure with said scanning electrodes, and pulse voltages for gradations required are applied selectively to said scanning electrodes and data electrodes so that picture elements determined by said scanning electrodes and data electrodes to which said pulse voltages are applied are caused to emit light, slots being provided in the waveforms of pulse voltages applied to said grid electrodes in such a manner that said slots occur at regular intervals, and the number of slots being determined in correspondence to the number of gradations required, to thereby make the luminance of said CRT adjustable according to environmental brightness.

4,707,639

DYNAMIC FOCUS VOLTAGE WITH PHASE COMPENSATED ADJUSTMENT

Walter Truskalo, Titusville, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Aug. 26, 1986, Ser. No. 900,531
Int. Cl.[4] H01J *29/58, 29/70*; H04N *5/228*
U.S. Cl. 315—382 **11 Claims**



1. An apparatus for generating a parabolic control voltage coupled to an electrode of a cathode ray tube of a video display apparatus for controlling the electron beam in said cathode ray tube, comprising:

means coupled to a deflection circuit for generating a first parabolic voltage representative of a parabolic voltage in a trace capacitance;

an attenuator coupled between said first parabolic voltage and said electrode for attenuating said first parabolic voltage to form an attenuated parabolic voltage that is coupled to said electrode, said attenuator including a capacitive phase compensation network that enables said attenuator to attenuate said first parabolic voltage to an amplitude that is required by said electrode without producing a substantial phase shift of said parabolic control voltage relative to that of said parabolic voltage that is generated in said trace capacitance; and

a transformer coupled between said first parabolic voltage and said electrode in a circuit path that includes said attenuator for magnetically coupling said first parabolic voltage to said electrode.

4,707,640

HORIZONTAL DEFLECTION OUTPUT CIRCUIT

Makoto Onozawa, Yokohama; Michitaka Osawa, Fujisawa; Hitoshi Maekawa, and Koji Kito, both of Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 7, 1985, Ser. No. 795,780
Claims priority, application Japan, Nov. 9, 1984, 59-234951
Int. Cl.[4] H01J *29/70*
U.S. Cl. 315—408 **32 Claims**

1. A horizontal deflection output circuit comprising:

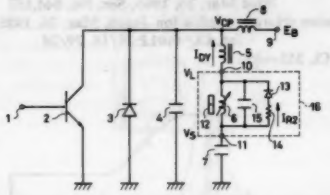
a switching element;

a resonant capacitor connected in parallel with said switching element; and

a first series circuit connected in parallel with said switching element and including a horizontal deflection coil and a linearity correcting coil,

wherein the improvement comprises:

a second series circuit connected in parallel with said linearity correcting coil, said second series circuit comprising load means for damping resonance energy in said first series circuit and current control means for limiting the current flow through said load means to the first half of a horizontal scanning period and including a one-way



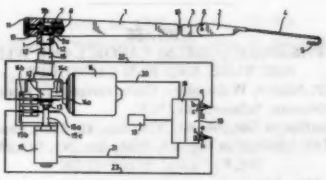
switching element which turns on for a first half of said horizontal scanning period and turns off for the last half of the horizontal scanning period and for a fly-back pulse period, thereby limiting current flow through said load means to the first half of said horizontal scanning period.

4,707,641

DRIVING MECHANISM FOR WIPER BLADES

Norbert Guerard, Virton, Belgium, and Christian Beneteau, Gorcy, France, assignors to Champion Spark Plug Europe S.A., Binche, Belgium

Filed Oct. 29, 1986, Ser. No. 924,429
Claims priority, application France, Nov. 13, 1985, 85 16760
Int. Cl.[4] B60S *1/36*
U.S. Cl. 318—443 **15 Claims**



1. A driving device for wiper blades of motor vehicles, comprising a first drive shaft (**12**), a first motor (**14**) for driving said first drive shaft, a wiper arm mounted on said first drive shaft and being driven in an oscillating movement by said first motor, said wiper arm having at least one element (**3, 58, 68, 78**) capable of moving radially with respect to said first drive shaft (**12**), characterized in that a second motor (**15, 53, 63**) imparts the radial movement to said one element (**3, 58, 68, 78**) that is capable of moving radially with respect to the first drive shaft (**12**).

4,707,642

ACTUATING DEVICE

Kanehiro Sorimachi, and Joji Amitani, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 583,884, Feb. 27, 1984, abandoned.
This application Oct. 14, 1985, Ser. No. 788,653
Claims priority, application Japan, Mar. 3, 1983, 58-35081; Mar. 3, 1983, 58-35082
Int. Cl.[4] H02K *33/00*
U.S. Cl. 318—37 **7 Claims**

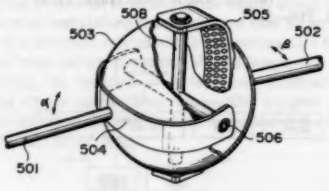
1. An activating device comprising:

two members moveable relatively to each other along a sperical surface so that movement of said members is three-dimensional;

said members being free to move in all directions relative to

each other and to move in at least two mutually orthogonal directions relative to said spherical surface,

a shaft extending from one of said members to be moved therewith; and



induction means for imparting to said members forces in mutually orthogonal directions along said surfaces for enabling said relative movement.

4,707,643

ROTARY SPEED RATIO CONTROL FOR A MULTIPLE ROTARY DRIVE SYSTEM FOR A TEXTILE-WORKING MACHINE

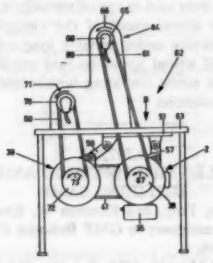
Gustav Rohr, Heidelberg, and Karl-Heinz Vetter, St. Leon-Rot, both of Fed. Rep. of Germany, assignors to Frankl & Kirchner GmbH, Schwetzingen, Fed. Rep. of Germany

Filed May 12, 1986, Ser. No. 862,059

Claims priority, application Fed. Rep. of Germany, May 10, 1985, 3516825

Int. Cl.⁴ H02P 5/46

U.S. Cl. 318—77 **6 Claims**



1. Circuit for a drive for a textile working machine with a first drive and a second drive, which can be actuated in correlation with a first drive motor at a rotatory speed that is variable relative to the drive motor, especially in relation to a stitch length, comprising: a first drive including a continuously drivable electric motor having a driven shaft and a first brake-clutch unit connected with this driven shaft, which has a clutch disk and brake disk and including a nonrotating brake abutment and a flywheel bearing a clutchface, said brake disk being capable of being brought into frictional engagement with said nonrotating braking abutment and said clutch disk being capable of being brought into frictional engagement with said flywheel bearing said clutch face, a second such brake-clutch unit which can be operated in correlation with said electric motor but can be operated independently , said second brake-clutch unit including a flywheel drive mechanically derived from said electric motor, the first brake-clutch unit having a driven shaft and the second brake-clutch unit having a driven shaft, the brake-clutch units being actuated such that the rotatory speed of the driven shaft of the second brake-clutch unit is synchronized through the rotatory speed of the driven shaft of the first brake-clutch unit pulse generators associated, one with said driven shaft of said first brake-clutch unit and the other with said driven shaft of said second brake-clutch unit, said pulse generators putting out series of pulses whose frequency is proportional to the rotatory speed N1, N2 of said driven shaft of said first and second brake-clutch units, respectively, a first speed control system responsive to pulses of a first of said pulse generators for performing a comparison of a required speed value and actual speed value, a system including an adjusting system (SL and RL) and responsive to the rotatory speed value of the driven shaft of the first brake-clutch unit for a step-less setting of said rotatory speed ratio and forming from it, according to the setting of the adjusting system, a required rotatory speed value for said driven shaft of said second brake-clutch unit such-that

$$N2 = N1 \times (SL/RL \times \text{constant}$$

and a second rotatory speed control system responsive to the required rotatory speed value of the driven shaft of the second brake-clutch unit and responsive to pulses of a second of said pulse generators proportional to the actual rotatory speed of the driven shaft of the second brake-clutch unit, the second brake-clutch unit having brake and clutch windings operated directly on the basis of the comparison of actual rotatory speed value and the required rotatory speed value of said driven shaft of said brake-clutch unit, said system for the stepless setting of said rotatory speed ratio including an amplifier having two inputs and an output, a transistor having a base, emitter and collector, a variable condenser, said system for the stepless setting of the rotatory speed ratio also including a first potentiometer as setting means (SL), having a center tap connected to a first input of said amplifier, a second potentiometer as a second setting means (RL), having one fixed contact connected to the other input of said amplifier and to the emitter of said transistor, the output of said amplifier being connected to the base of said transistor whose collector is connected to said variable condenser and to the input of the second rotatory speed control system, the output of the first rotatory speed control system being carried to said condenser.

4,707,644

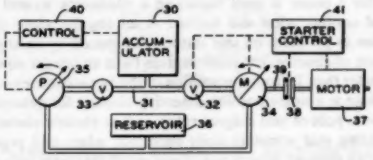
AUXILIARY STARTING FOR ELECTRIC MOTORS

John W. Miller, St. Paul; Melvin F. Mittelmark, Minneapolis, and Roger N. Schmidt, Plymouth, all of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed May 11, 1981, Ser. No. 262,564

Int. Cl.⁴ H02P 1/00

U.S. Cl. 318—136 **1 Claim**



1. An auxiliary starting system for electric motors comprising:

fluid operated motor means;

accumulator means for supplying an amount of fluid at high pressure to the fluid-operated motor means;

means for connecting the output shaft of said fluid-operated motor means to transfer rotational torque to the shaft of the prime mover motor to be started; and

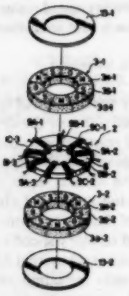
switching means for reversing the fluid flow through said fluid operated motor for allowing said prime mover motor to charge said accumulator means.

4,707,645

SINGLE-PHASE BRUSHLESS MOTOR

Osami Miyao, Sagamihara; Manabu Shiraki, Yamato, and Masayuki Ohsaka, Sagamihara, all of Japan, assignors to Shicoh Engineering Co., Ltd., Yamato, Japan

Filed Oct. 30, 1986, Ser. No. 924,902
Claims priority, application Japan, Jul. 25, 1986, 61-176337
Int. Cl.[4] H02K *23/00*
U.S. Cl. 318—254 1 Claim



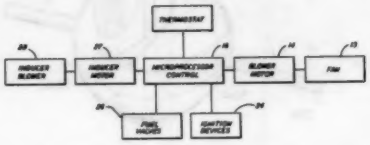
1. A single-phase brushless motor, comprising: a magnet rotor having n (n is an integer equal to or greater than 1) north magnetic pole zone or zones having an angular width of 120 or about 120 degrees in electrical angle, n south magnetic pole zone or zones having an angular width of 120 or about 120 degrees in electical angle, and n non-magnetized or substantially non-magnetized zone or zones having an angular width of 120 or about 120 degrees; a stator armature mounted in an opposing relationship to said magnet rotor with an air gap left therebetween, said stator armature including an annular stator yoke, n armature coil or coils for the phase u each including a conductor wound in a troidal configuration and located at an angular same phase position or positions of about u·360 degrees (u is an integer equal to or greater than 1) in electrical angle on said annular stator yoke, n armature coil or coils for the phase v each including a conductor wound in a troidal configuration and located at an angular same phase position or positions on said stator yoke spaced by an angular distance of about v·360+120 degrees (v is an integer equal to or greater than 1) from the position of one of said armature coils for the phase u at the angular position of 360 degrees, and n armature coil or coils for a phase w each including a conductor wound in a troidal configuration and located at an angular same phase position or positions on said stator yoke spaced by an angular distance of about w·360+240 degrees (w is an integer equal to or greater than 1) from the position of the one armature coil for the phase u; a single position detecting element for detecting a magnetic pole of said magnet rotor; and an electric circuit for energizing said armature coils such that when said position detecting element detects one of said north magnetic pole zone or zones of said magnet rotor, and n armature coil or coils for the phase u at the same phase positions are energized over a range of an angle of 120 or about 120 degrees in electrical angle, and when said position detecting element detects one of said south magnetic pole zone or zones of said magnet rotor, said n armature coil or coils for the phase v at the same phase positions are energized over another range of an angle of 120 or about 120 degrees in electrical angle, but when said position detecting element detects one of said non-magnetized or substantially non-magnetized zone or zones or any other non-magnetized portion, said n armature coil or coils for the phase w at the same phase positions are energized over a further range of an angle of 120 or about 120 degrees in electrical angle.

4,707,646

METHOD OF LIMITING MOTOR POWER OUTPUT

Kevin D. Thompson, and Gary W. Ballard, both of Indianapolis, Ind., assignors to Carrier Corporation, Syracuse, N.Y.

Filed May 29, 1986, Ser. No. 868,378
Int. Cl.[4] G05B *5/00*; H02K *17/34*
U.S. Cl. 318—332 7 Claims



1. A method of controlling the power output of a variable speed motor operating to drive a device under variable load conditions comprising the steps of:

(a) driving a representative device by operating said representative motor over a range of speeds and sensing parameters to determine the relationship of representative motor speed to work output of said representative device;

(b) driving said representative device with said motor operating at maximum power conditions over a range of variable load conditions, and sensing parameters to determine the work outputs and the corresponding speeds and power outputs of said representative motor over said range;

(c) establishing a particular power output limit for the motor;

(d) using the above determinations to calculate the maximum allowable motor speeds corresponding to said power output limit over said range of variable load conditions;

(e) sensing the actual speed of the variable speed motor driving the device under variable load conditions; and

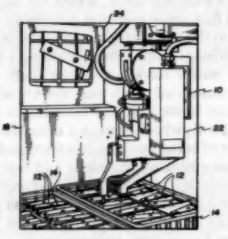
(f) limiting said actual speed to said maximum allowable motor speeds while operating within said range of variable load conditions.

4,707,647

GRAY SCALE VISION METHOD AND SYSTEM UTILIZING SAME

Bruce E. Coldren, Troy, and Kenneth W. Krause, Rochester, both of Mich., assignors to GMF Robotics Corporation, Auburn Hills, Mich.

Filed May 19, 1986, Ser. No. 864,416
Int. Cl.[4] G05B *19/18*; G06F *15/46*
U.S. Cl. 318—568 13 Claims



1. Method for automatically locating an object at a vision station, said method comprising the steps of:

generating reference data relating to at least two features of an ideal object, the data including at least two edge points, one of said points being on each of a pair of non-parallel edge segments wherein the reference data includes directional data for each of the edge points;

generating a gray-scale digital image containing the objects to be located at the vision station;

processing the reference data and the ditital image together to obtain an accumulator image, said processing step including the steps of performing an edge-detecting convolution on at least a portion of the digital image for each edge point and shifting the convoluted data by an amount and in a direction related to the directional data for each of said edge points to obtain a shifted image; and

determining the location of at least one localized bright region in the accumulator image, the location of said region corresponding to the location of one of the features within the digital image.

4,707,648

FOCUS SERVOMECHANISM CONTROL SYSTEM OF OPTICAL DISC SYSTEM HAVING OFFSET SETTING MEANS

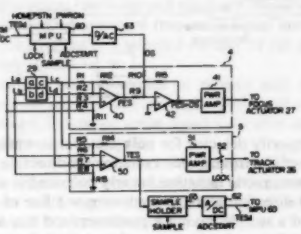
Akira Minami, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Nov. 25, 1986, Ser. No. 934,787

Claims priority, application Japan, Nov. 28, 1985, 60-267679; Mar. 11, 1986, 61-53241

Int. Cl.[4] G05B *1/06*

U.S. Cl. 318—640 **12 Claims**



1. A focus servomechanism control system in an optical disc system including a rotatable optical disc having at least one track storing data therein, a unit for focusing light for data write and read relative to said track and a unit for sensing light reflected from said track, for controlling said light focusing unit to adjust a focus of said light on said track, comprising:

(a) first means, operatively connected to said light focusing unit, for moving said light focusing unit in a direction perpendicular to a plane of said optical disc;

(b) second means, operatively connected to said light sensing unit, for producing a focus error signal;

(c) third means, operatively connected to said light sensing unit, for producing a track error signal;

(d) fourth means, operatively connected to said second means, for receiving an offset parameter and controlling a position of said light focusing unit through said first means in response to said focus error signal and said offset parameter; and

(e) fifth means, operatively connected to said third and fourth means, during an offset adjustment mode, for continuously setting a plurality of offset parameters to said fourth means, to determine a maximum amplitude of said track error signal, and to set the offset parameter producing said maximum amplitude of said track error signal to said fourth means.

4,707,649

MOTOR CONTROLLING SYSTEM

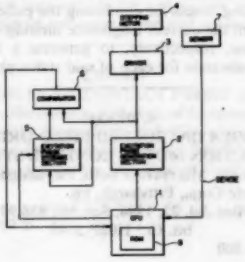
Shoji Kanemura, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 18, 1985, Ser. No. 712,780

Claims priority, application Japan, Mar. 26, 1984, 59-56222

Int. Cl.[4] G05B *19/40*

U.S. Cl. 318—685 **19 Claims**



1. A motor controlling system for controlling movement of a motor, said system comprising:

means for detecting a signal;

control means for allowing said motor to be driven by a predetermined amount of movement after the signal is detected by said detecting means; and

means for storing, as a reference position for movement of said motor, an indication of the position of said motor within a cycle of an excitation sequence of said motor after said motor is allowed to be driven by the predetermined amount of movement by said control means.

4,707,650

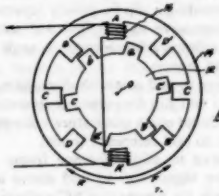
CONTROL SYSTEM FOR SWITCHED RELUCTANCE MOTOR

Bimal K. Bose, Latham, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Oct. 3, 1986, Ser. No. 915,288

Int. Cl.[4] G05B *19/40*

U.S. Cl. 318—685 **48 Claims**



1. A closed-loop control system for a multiphase switched reluctance motor in which the current of each stator phase is controllably switched on and off in synchronism with rotor position, comprising:

encoder means for generating rotor position information signals;

speed computation means for generating an actual speed signal from said rotor position information signals;

feedback control means for receiving and processing said actual speed signals from said speed computation means and for receiving an operator command to generate a current command, a turn-on angle signal and a pulsewidth angle signal;

angle control means connected to said feedback control means for receiving and converting said turn-on angle

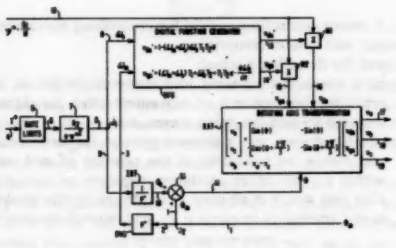
signal and pulsewidth angle signal into a pulsetrain of conduction angle pulses synchronized with rotor position for each stator phase, the pulsetrains for the different stator phases being mutually phase-shifted; and

current control means for receiving and comparing the current command from said feedback control means with the actual current of each stator phase to generate a current magnitude limiting signal for each stator phase, said current control means also receiving the pulsetrains from said angle control means, said current control means having coupling means for combining the pulsetrain for each phase with the current magnitude limiting signal for said each phase, respectively, to generate a stator current control pulsetrain for each of said stator phases.

4,707,651
VOLTAGE-CONTROLLED FIELD-ORIENTED INDUCTION MOTOR CONTROL SYSTEM

Colin D. Schauder, Murrysville Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 22, 1986, Ser. No. 888,907
Int. Cl.[4] H02P 5/40
U.S. Cl. 318—800 4 Claims



1. In an induction motor drive control system associated with an AC power supply applying to the induction motor a controlled AC voltage power supply as a function of a motor torque demand;

the combination of:

first means for providing a motor shaft position representative signal;

second means responsive to a predetermined torque demand signal for providing a slip frequency representative signal;

third means responsive to said first and second means for providing a reference frame rotation angle representative signal for said motor;

means responsive to said motor shaft position representative signal and to said slip frequency representative signal for providing a direct and a quadrature voltage signal defined by reference to said reference frame;

means responsive to said reference frame rotation angle representative signal and to said direct and quadrature voltage signals for generating AC voltage representative signals for said AC power supply;

with said direct and quadrature voltage signals providing means providing a direct voltage signal v_{ds}, where:

$$v_{ds}=1-(\omega_m+\omega_s)\omega_s T_1 T_2 \sigma$$

and a quadrature voltage signal v_{qs}, where:

$$v_{qs}=(\omega_m+\omega_s)T_1+\omega_s T_2+T_1 T_2 \sigma d\omega_s/dt;$$

and where:

ω=electrical angular velocity of the reference frame;

ω_m=electrical angular velocity of motor shaft;

R_1=stator resistance per phase;

R_2=rotor resistance per phase;

L_1=three-phase stator self-inductance;

L_2=three-phase rotor self-inductance;

M=three-phase stator/rotor mutual inductance;

ω_s=slip frequency;

$\sigma=(1-M^2/L_1L_2)$;

$T_2=L_2/R_2$;

$T_1=L_1/R_1$;

n=pole pair number of the machine; and

p=d/dt;

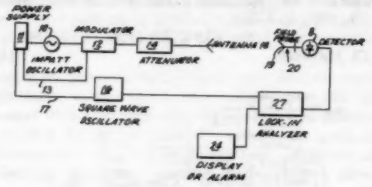
with means for imposing a maximum on the rate of change of said predetermined torque demand signal being interposed between said predetermined torue demand signal and said second means;

with said AC voltage power supply being controlled by said AC voltage representative signals, thereby to dynamically generate a torque proportional to said predetermined torque demand signal when said predetermined torque demand signal changing, while not exceeding said maximum rate of change.

4,707,652
IMPURITY DETECTOR MEASURING PARALLEL POLARIZED SCATTERED ELECTROMAGNETIC RADIATION

David A. Lowitz, Richmond, Va., assignor to Philip Morris Incorporated, New York, N.Y.

Continuation-in-part of Ser. No. 556,736, Nov. 30, 1983, abandoned. This application Oct. 31, 1985, Ser. No. 793,640
Int. Cl.[4] G01R 27/04
U.S. Cl. 324—58.5 B 29 Claims



1. An impurity detector for bulk material comprising:

a source of electromagnetic radiation for directing a beam of electromagnetic radiation linearly polarized in a predetermined direction along a predetermined line of incidence toward a sample having a predetermined size and shape, said radiation having a predetermined frequency and wavelength; wherein:

said sample scatters said beam of radiation through reflection, interference, and refraction as a function of scattering angle, the intensity of scattered radiation polarized in a direction parallel to said predetermined direction forming a scattering intensity spectrum varying between localized maxima and minima as a function of scattering angle;

said impurity detector further comprising:

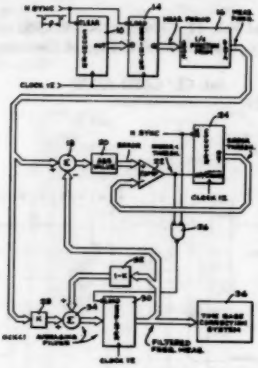
a radiation detection means sensitive to the angular scattering intensity spectrum for generating a signal relating to the intensity of radiation scattered from said sample and polarized only in a direction parallel to said predetermined direction, said signal being characteristic of said angular scattering intensity spectrum, such that said radiation detection means would generate a known intensity signal if said sample were free of impurities, said radiation detection means generating a signal having an intensity different from said known intensity when said sample contains any impurity which changes effective bulk dielectric constant of said sample; and

means for indicating the presence of an impurity in said sample, said means for indicating being connected to said radiation detection means, wherein said means for indicating responds solely to said differing intensity signal, thereby indicating the presence of an impurity which changes the effective bulk dielectric constant of said sample.

4,707,653
FREQUENCY MEASUREMENT CIRCUIT

Steven D. Wagner, San Jose, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed Oct. 17, 1985, Ser. No. 788,352
Int. Cl.[4] G01R 23/02
U.S. Cl. 324—78 R 19 Claims

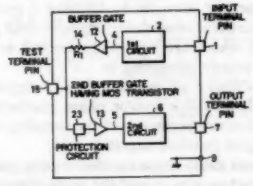


1. A frequency measurement circuit comprising:
a source of input pulse signals;
means for producing a measured frequency signal indicative of the frequency of the input pulse signals;
first channel means receiving said measured frequency signal for producing an averaged frequency signal corresponding to the average of a selected number of the measured frequency signals;
second channel means coupled to receive said measured frequency signal and said averaged frequency signal for generating a difference error signal indicative of the difference between the signals;
said second channel means includes means for producing a variable threshold, which threshold is increased if the difference error signal is greater than the threshold and decreased if it is less than the threshold; and
said first channel means includes means for updating the averaged frequency signal when the difference error signal is less than the threshold.

4,707,654
INTEGRATED CIRCUIT HAVING INPUT AND OUTPUT TERMINALS FOR TESTING

Toshiro Suzuki, Tama; Fumiaki Fujii, Nishitama, and Izuru Yamada, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 6, 1985, Ser. No. 773,302
Claims priority, application Japan, Sep. 14, 1984, 59-191551
Int. Cl.[4] C01R 31/28
U.S. Cl. 324—158 R 4 Claims

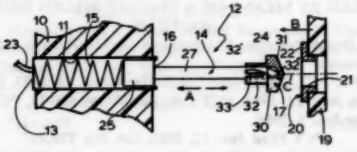


1. An integrated circuit comprising:
at least a first circuit and a second circuit to be connected in series;
a first buffer gate, a resistor, and a second buffer gate connected between an output terminal of said first circuit and an input terminal of said second circuit in the order mentioned; and
means for allowing testing of the output of the first circuit and for allowing the application of an input test signal to said second circuit without said input test signal having to pass through said first circuit, said means comprising an input/output terminal pin for test signals provided at a junction point of said resistor and said second buffer gate.

4,707,655
CONTACT FOR MULTICONTACT PROBE ASSEMBLY

Gustave Krüger, Herrenberg, Fed. Rep. of Germany, assignor to Feinmetall GmbH, Herrenberg, Fed. Rep. of Germany

Filed Jun. 11, 1985, Ser. No. 743,589
Claims priority, application Fed. Rep. of Germany, Jun. 12, 1984, 3421720
Int. Cl.[4] G01R 1/06
U.S. Cl. 324—158 P 16 Claims

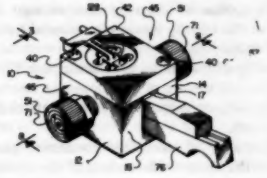


1. A contact for a multicontact probe assembly for testing at least partially conductive elements, the contact comprising
a conductive contact rod extending along an axis, and having a rear end, and a front end,
a conductive cap engageable axially snugly over the front end of the rod, said front end being pointed so as to serve as a test end for testing said conductive elements upon said cap being removed from said front end of said rod, and
securing means for releasably securing said cap on said front end, whereby at least two differently formed test contacts are obtainable on said probe assembly by selectable use and non-use of said cap.

4,707,656
CIRCUIT TEST FIXTURE

Jose M. Marzan, 7860 Texhoma, Northridge, Calif. 91325

Filed Mar. 18, 1985, Ser. No. 712,803
Int. Cl.[4] G01R 31/02
U.S. Cl. 324—158 F 9 Claims



1. A test apparatus for making electrical contact with a generally flat substrate, the substrate having edges and upper surface comprising:
(a) fixture means having upstanding side walls and receiving slot means for receiving a substrate holder with a substrate mounted on the substrate holder inserted such that the substrate holder moves in the receiving slot means gener-

ally parallel to the side walls and with opposite edges of the substrate being generally parallel to the side walls;

(b) launcher means through each side wall in the fixture means and extending into the receiving slot means for making electrical contact at a center location and two outside locations on the edges of substrate; and

(c) launcher mounting means in the fixture means for mounting at least a portion of the launcher means for rotation about an axis parallel to the plane of the substrate.

4,707,657

CONNECTOR ASSEMBLY FOR A CIRCUIT BOARD TESTING MACHINE, A CIRCUIT BOARD TESTING MACHINE, AND A METHOD OF TESTING A CIRCUIT BOARD BY MEANS OF A CIRCUIT BOARD TESTING MACHINE

Allan Boegh-Petersen, Floogvaenget 14, Hedehusene DK-2640, Denmark

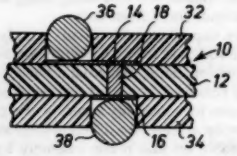
PCT No. PCT/DK85/00057, § 371 Date Aug. 12, 1985, § 102(e) Date Aug. 12, 1985, PCT Pub. No. WO86/00173, PCT Pub. Date Jan. 3, 1986

PCT Filed Jun. 12, 1985, Ser. No. 770,867

Claims priority, application Denmark, Jun. 13, 1984, 2911/84

Int. Cl.[4] G01R *1/06*

U.S. Cl. 324—158 F 13 Claims



1. A connector assembly for a circuit board testing machine having a test surface including a number of test points electrically insulated relative to one another and arranged in a matrix configuration and for testing a circuit board of an electrically insulating material having circuit tracks of an electrically conductive material arranged on at least one side surface thereof,

the connector assembly being adapted to provide electrical connection between selected areas of the circuit board and selected test points of the test surface of the testing machine, the connector assembly comprising:

a board of an electrically insulating material having opposite first and second side surfaces,

a first plurality of individual connector pads being arranged on the first side surface of the connector assembly board in a configuration corresponding to said selected areas of the circuit board,

a second plurality of individual connector pads being arranged on the second side surface of the connector assembly board in a configuration corresponding to said selected test points of the testing machine,

electrical conductor means extending through the connector assembly board and electrically connecting said individual connector pads of said first plurality to respective individual connector pads of said second plurality, and

connector contact means secured to each of said first and second connector pads.

4,707,658

METHOD OF RAPID ACQUISITION OF SPIN RESONANCE DATA FOR A SPATIALLY RESOLVED INVESTIGATION OF AN OBJECT

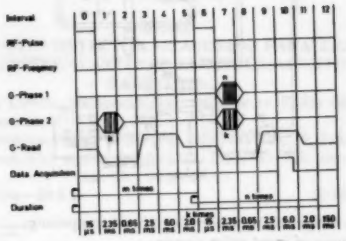
Jens Frahm; Axel Haase; Dieter Matthaei; Wolfgang Haenicke, and Klaus-Dietmar Merboldt, all of Goettingen, Fed. Rep. of Germany, assignors to Max-Planck-Gesellschaft zur Foerderung der Wissenschaften e.V., Goettingen, Fed. Rep. of Germany

Filed Feb. 12, 1986, Ser. No. 828,956

Claims priority, application Fed. Rep. of Germany, Feb. 12, 1985, 3504734

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—309 14 Claims



1. A method for a rapid acquisition of spin resonance data for a spatially resolved investigation of an region of an object comprising atomic spins, such as nuclear spins, which exhibit a predetermined spin-lattice relaxation time T_1, a predetermined spin-spin relaxation time T_2 and a predetermined effective spin-spin relaxation time T_2^*, the method comprising the steps:

(a) positioning said object region in a homogeneous magnetic field (B_o) to align the spins into a predetermined direction (Z direction),

(b) irradiating said object region with a radio frequency (r.f.) pulse which tilts the spins by a predetermined angle (flip angle) out of said predetermined direction;

(c) applying at least one coding magnetic field gradient (slice gradient, phase gradient) to said region;

(d) effecting after the termination of the r.f. pulse at least once;

(aa) applying to said region at least one reading gradient with a predetermined polarity for a predetermined period of time;

(bb) reversing the polarity of each reading gradient to produce a gradient echo signal;

(cc) maintain each polarity reversed reading gradient for a desired reading period;

(dd) sampling said gradient echo signal;

(e) switching off each reading gradient and

(f) repeating the method steps (b) to (e) after a predetermined delay, wherein at most three magnetic field gradients are applied which are essentially normal to each other, the improvement consisting in

(g) the flip angle of the r.f. pulse is less than 75 degrees;

(k) all coding gradients (slice and/or phase gradients) are switched off before the beginning of the sampling of the gradient echo signal (method step (dd); and

(i) the predetermined delay between the reading gradient switching off (method step e) and the application of the next following r.f. pulse is substantially smaller than the spin-lattice relaxation time.

4,707,659

METHOD AND DEVICE FOR DETERMINING AN NMR DISTRIBUTION IN A REGION OF A BODY

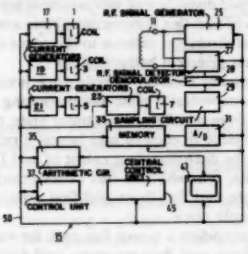
Dietmar W. Kunz, Hamburg, Fed. Rep. of Germany; Hans H. Tuithof, and Johannes J. M. Cuppen, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 30, 1985, Ser. No. 729,007

Claims priority, application Netherlands, May 2, 1984, 8401382; Sep. 18, 1984, 8402855

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—309 28 Claims



5. A device for determining an NMR distribution in a region of a body, comprising:

(a) means for generating a steady, uniform magnetic field,

(b) means for generating a frequency modulated r.f. electromagnetic pulse having a substantially rectangular shape and leading and trailing edges which are determined by a Gaussian curve so as to produce a nuclear spin resonance signal in said region of said body,

(c) means for generating a gradient magnetic field,

(d) sampling means for sampling said resonance signal so as to obtain a group of signal samples,

(e) processing means for processing the groups of signal samples supplied by the sampling means so as to produce an image of an NMR distribution, and

(f) control means for controlling said pulse generating means, said gradient field generating means, said sampling means and said processing means.

4,707,660

FAST METHOD AND DEVICE FOR DETERMINING AN NMR DISTRIBUTION IN A REGION OF A BODY

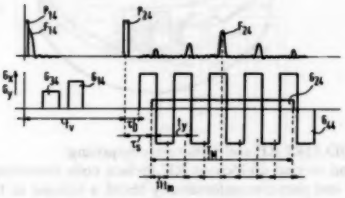
Johannes J. M. Cuppen, and Johannes P. Groen, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 22, 1985, Ser. No. 768,400

Claims priority, application Netherlands, Sep. 10, 1984, 8402752; Nov. 28, 1984, 8403611

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—309 27 Claims



1. A method of determining an NMR distribution in a region of a body which is situated in a steady, uniform magnetic field, said method including the steps of:

(a) generating an r.f. electromagnetic pulse during a preparation period in order to cause a precessional motion of the magnetization of the nuclei in the body, thus generating a resonance signal,

(b) then generating an alternating, periodic gradient magnetic field during a measurement period, said measurement period being divided into a plurality of sampling intervals during which a corresponding number of signal samples of the resonance signal are taken,

(c) then repeating, each time after a waiting period, steps (a) and (b), the duration of the preparation period and/or the integral over the preparation period of at least one gradient magnetic field applied during the preparation period having a different value during each repetition in order to provide a set of signal samples from which, after a signal transformation thereof, an image of a nuclear magnetization distribution is determined, characterized in that the period of the sampling interval is at least a factor 2 shorter than the period of the alternating periodic gradient magnetic field which at most equals the measurement period.

4,707,661

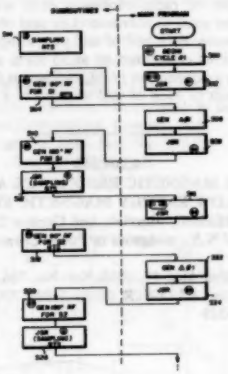
MACHINE GENERATION OF MACHINE-EXECUTABLE STATE-CHANGE INSTRUCTIONS FOR MAGNETIC RESONANCE IMAGING

John C. Hoenninger, III, Oakland, and Lawrence E. Crooks, Richmond, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Jul. 29, 1986, Ser. No. 890,364

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—309 6 Claims



1. A process of machine generating machine executable state-change instructions for a sequence controller of a multi-slice magnetic resonance imaging (MRI) system, said process comprising the steps of:

defining predetermined program-change tables T1, T2, . . . Tn of MRI parameter values in a machine accessible memory;

defining predetermined slice-specific program segments P1, P2, . . . Pm of machine executable MRI sequencer instructions in a machine accessible memory, which segments are referenced by predetermined respective symbolic addresses and which segments include pointer-references to said tables; and

machine replicating a predetermined set of said slice-specific program segments in a predetermined order while indexing the corresponding symbolic addresses and referenced table entries in a predetermined sequence so as to maintain proper correspondence between slice-specific main programs and subroutines in each replicated segment.

4,707,662

MR-APPARATUS HAVING A TRANSMISSION-MEASURING COIL FOR HIGH FREQUENCIES

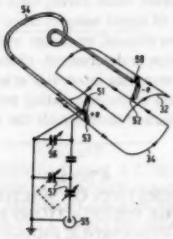
Rudolf Kemner; Hilco T. Kalmijn, and Teunis R. Van Heelsbergen, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 5, 1985, Ser. No. 752,281

Claims priority, application Netherlands, Jul. 30, 1984, 8402380

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—318 **7 Claims**



1. An MR apparatus having a magnet system for generating a uniform, principal magnetic field in a measurement space, means for generating, in said measurement space, a spatially uniform radio-frequency alternating field and means for detecting an MR signal generated in an object under examination disposed in said measurement space, said generating means including a pair of radio-frequency coils which are spaced from each other so as to accommodate said object to be examined therebetween, each coil of said pair being comprised of at least two sections connected so as to form a loop and each section having a connection point, and means for coupling said connection point of each of said sections to a radio-frequency supply source.

4,707,663

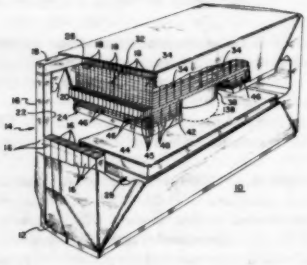
NUCLEAR MAGNETIC RESONANCE APPARATUS USING LOW ENERGY MAGNETIC ELEMENTS

Lawrence A. Minkoff, Merrick, and Gordon T. Danby, Melleville, both of N.Y., assignors to Fonar Corporation, Melville, N.Y.

Filed Aug. 15, 1985, Ser. No. 766,115

Int. Cl.[4] G01R *33/20*; H01F *7/00*

U.S. Cl. 324—319 **22 Claims**



5. An NMR scanner including a field-producing apparatus comprising:

(a) a frame of magnetically soft material defining an opening, said frame including a first frame member on one side of said opening;

(b) a first magnet structure projecting from said first frame member into said opening in a first direction, said first structure including:

(1) a principal magnetic flux-producing body producing magnetic flux in a flux direction parallel to said first direction, said principal body having a distal face remote from said first frame member and facing away from said first frame member, said distal face extending in lateral directions transverse to said first direction;

(2) a magnetically conductive flux concentrator plate overlying said distal face of said principal body, the extent of said first flux concentrator plate in each of said lateral directions being less than the corresponding extent of said distal face of said principal body, whereby the edges of said flux concentrator plate are recessed in said lateral directions relative to the edges of said distal face of said principal body; and

(3) a magnetically conductive pole piece juxtaposed with said flux concentrator plate and projecting in said first direction from said flux concentrator plate, the extent of said pole piece in each of said lateral directions being less than the corresponding extent of said flux concentrator plate, whereby said flux concentrator plate will concentrate said flux from said first principal body in said first pole piece

said frame providing a return flux path for magnetic flux emanating from said first structure, said field-producing apparatus being adapted to receive a human body in said opening adjacent said pole piece and to provide a magnetic field within a scanning volume adjacent said pole piece for NMR imaging of a human body disposed within said opening.

4,707,664

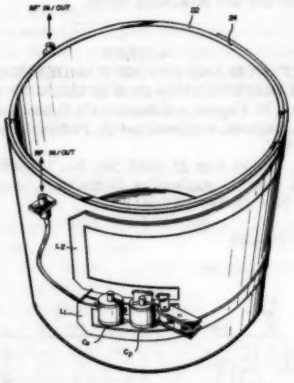
QD MRI RE COIL USING NON-HOMOGENEOUS AND NON-UNIFORM RF FIELD DISTRIBUTION

John H. Fehn, El Sobrante; Mitsuaki Arakawa, Hillsborough, and Barry M. McCarten, Piedmont, all of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Jun. 25, 1986, Ser. No. 878,369

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—322 **12 Claims**



7. A QD MRI RF coil structure comprising:

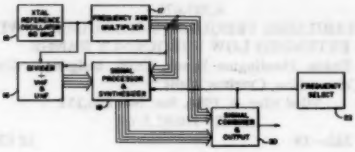
first and second co-located RF surface coils extending axially and part-circumferentially about a volume to be imaged but being rotationally offset so as to produce a pair of RF signals from said volume which are in quadrature phase while the RF fields produced thereby are non-symmetric, non-homogeneous and non-uniform within said volume.

4,707,665

LOW NOISE SIGNAL GENERATOR

John L. Nugent, Essex; George C. Rush, Sykesville, and Norman G. Matthews, Cockeysville, all of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 31, 1984, Ser. No. 575,429
Int. Cl.[4] H03B *19/00*; H04B *11/32*
U.S. Cl. 328—14 7 Claims



1. A signal generator which generates output signals stepped in discrete frequency increments comprising:

(a) a stable oscillator for generating a fundamental reference signal;

(b) a multiplier to which said fundamental reference signal is applied for generating a plurality of coherent reference signals, each having a frequency which is a multiple of the frequency of said fundamental reference signal and coherent thereto;

(c) a divider to which is input at least one of said plurality of coherent reference signals, and the fundamental reference signal also input to the divider for generating a plurality of coherent low frequency signals in the UHF and VHF range;

(d) a synthesizer for selectively combining said plurality of coherent reference signals and said plurality of low frequency reference signals to produce a plurality of incrementally spaced apart signals; and

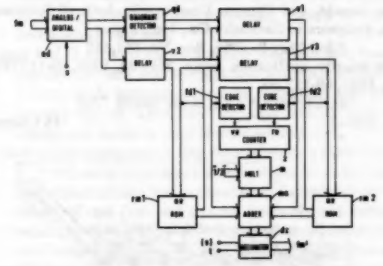
(e) a combining circuit for combining said plurality of incrementally spaced apart signals from said synthesizer and plurality of coherent reference signals to produce the signal generator output signal which is stepped in discrete frequency increments.

4,707,666

FREQUENCY DEMODULATOR CIRCUIT WITH ZERO-CROSSING COUNTER

Heinrich Pfeifer, Denzlingen, and Rainer Schweer, Waldkirch, both of Fed. Rep. of Germany, assignors to Deutsche ITT Industries GmbH, Freiburg, Fed. Rep. of Germany

Filed Jul. 15, 1986, Ser. No. 886,203
Claims priority, application European Pat. Off., Jul. 27, 1985, 85109489
Int. Cl.[4] H03D *3/00*
U.S. Cl. 329—110 5 Claims



1. A frequency demodulator circuit comprising:

an analog to digital converter receiving an input signal to be demodulated and clocked by a sampling signal at a first frequency;

a quadrant detector having its input connected to the output of said analog-to-digital converter;

first delay means having its input coupled to said analog-to-digital converter output;

second delay means having its input coupled to said analog-to-digital converter output;

third delay means having its input coupled to the output of said second delay means;

a first edge detector coupled to the sign bit of the output of said second delay means output;

a second edge detector coupled to a sign bit of the output of said third delay means;

an up/down counter having an up input coupled to the output of said first edge detector and having a down input coupled to the output of said second edge detector;

means for multiplying the output of said up/down counter by $\frac{1}{4}$;

first arcsin memory means having address inputs coupled to the output of said first delay means and having data outputs;

second arcsin memory means having address inputs coupled to the output of said third delay means and having data outputs;

a multiple adder for adding the output of said multiplying means to said first arcsin memory means data outputs combined with the outputs of said quadrant detector and to said second arcsin memory means data outputs combined with the output of said first delay means; and

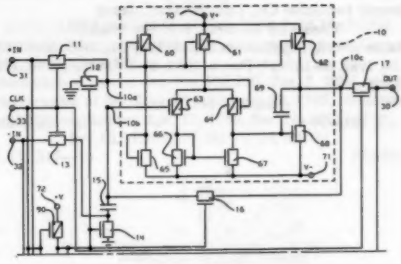
a decimator having inputs coupled to the output of said multiple adder, said decimator being clocked by said sampling signal and providing a digital demodulated output signal.

4,707,667

OFFSET CORRECTED AMPLIFIER

John E. Bertsch, Essex Junction, Vt., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 30, 1986, Ser. No. 857,651
Int. Cl.[4] H03F *1/26*
U.S. Cl. 330—9 10 Claims



1. A circuit for correcting the offset voltage of an operational amplifier having positive and negative inputs and an output comprising:

positive and negative input voltage means for applying a differential voltage to said positive and negative inputs of said operational amplifier,

a feedback loop coupling the output of the amplifier to its negative input characterized by a capacitor positioned between the negative input of the amplifier and said negative input voltage means,

means for selectively coupling the positive input of the amplifier to ground, and

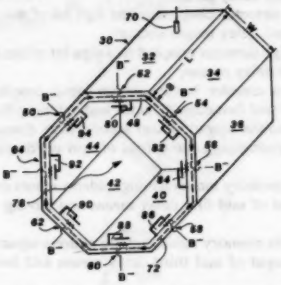
means for selectively coupling the side of said capacitor coupled to the negative input voltage means to ground.

4,707,668

METHOD AND APPARATUS FOR TRANSFERRING AND INJECTING RF ENERGY FROM A GENERATOR TO A RESONANT LOAD

William J. Hoffert, Albuquerque, N. Mex., assignor to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed May 5, 1986, Ser. No. 859,949
Int. Cl.[4] H03F 3/60
U.S. Cl. 330—56 11 Claims



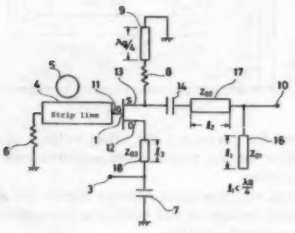
1. An amplifier for transferring rf energy to an adjacent load, comprising:
- an input strip line resonator defining a continuous input cavity forming a closed path for receiving said rf energy;
- a plurality of amplifier tubes mounted in said input cavity for coherently amplifying said rf energy transmitted through said continuous cavity;
- said strip line resonator having a width effective to obtain an output impedance to match an input impedance of said plurality of amplifier tubes; and
- a load cavity within said closed path defined by said strip line resonator for receiving said amplified rf energy.

4,707,669

DIELECTRIC RESONATOR MICROWAVE OSCILLATOR HAVING ENHANCED NEGATIVE RESISTANCE

Tsuyoshi Mekata, Hirakata; Hiroshi Saka, Katano, and Toshihide Tanaka, Ikoma, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed May 20, 1986, Ser. No. 864,862
Claims priority, application Japan, May 21, 1985, 60-108830; Jul. 30, 1985, 60-167917; Dec. 6, 1985, 60-275301; Apr. 15, 1986, 61-86476
Int. Cl.[4] H03B 5/18
U.S. Cl. 331—99 12 Claims



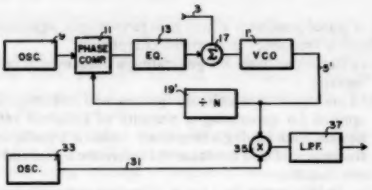
1. A dielectric resonator microwave oscillator having enhanced negative resistance comprising:
- an FET, having a gate, a drain and a source;
- a microwave resonator connected to said gate of said FET;
- an inductive element, one end of which is connected to said drain of said FET, and the other end of which is grounded with respect to microwave frequency;
- an output terminal;
- a series connection of a second inductive element and a first capacitive element connected between said source of said FET and said output terminal; and
- a second capacitive element, having one end connected to said output terminal and another end which is grounded with respect to microwave frequency.

4,707,670

PLL STABILIZED FREQUENCY MODULATOR WITH EXTENDED LOW FREQUENCY RANGE

W. Ray Dakin, Huntington Beach, Calif., assignor to Optical Disc Corporation, Cerritos, Calif.

Filed Mar. 4, 1986, Ser. No. 836,111
Int. Cl.[4] H03C 3/09
U.S. Cl. 332—19 10 Claims



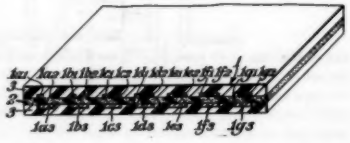
1. A frequency modulator for producing a carrier signal modulated above and below a desired center frequency in proportion to an information signal, comprising:
- voltage controlled oscillator means responsive to a voltage varying with time information signal for producing an output signal having a frequency varying with the voltage of said information signal;
- reference source means producing first and second reference signals having constant frequencies, the difference between the frequency of said second reference signal and said desired center frequency being a predetermined factor times the frequency of said first reference signal;
- phase locked loop means stabilizing the center frequency of said voltage controlled oscillator at a frequency equal to said predetermined factor times the frequency of the first reference signal, said phase locked loop means having a loop bandwidth below the lowest frequency in said information signal;
- means for multiplying said second reference signal times said output signal to form a product signal; and
- filter means for limiting the bandwidth of the product signal to form said modulated carrier signal.

4,707,671

ELECTRICAL TRANSMISSION LINE

Hirosuke Suzuki, and Tetsuro Umebayashi, both of Saitama, Japan, assignors to Junkosha Co., Ltd., Japan

Filed May 9, 1986, Ser. No. 861,418
Claims priority, application Japan, May 31, 1985, 60-117797; May 31, 1985, 60-117798
Int. Cl.[4] H01P 3/00, 3/08; H01B 7/08
U.S. Cl. 333—1 16 Claims



1. A high conductor density electrical transmission line

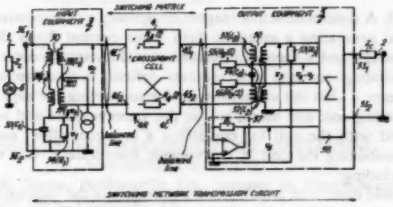
comprising a porous dielectric layer having positioned on one side thereof at least one pair of narrow, parallel elongated electrical conductors spaced apart from each other and on the other side of said layer, opposite said pair of conductors and extending transversely across but not beyond both conductors of said pair and arranged parallel to said pair, at least one wide ground conductor, this assembly being covered with a solid, electrically insulating resin layer.

4,707,672

END EQUIPMENTS FOR WIDEBAND TRANSMISSION LINE

Christian Duret, 6, rue de l'Epargne, 92320 Chatillon, and Francis Pirio, 5, Square Grande, 75013 Paris, both of France

Filed Jul. 7, 1986, Ser. No. 882,381
Claims priority, application France, Jul. 8, 1985, 85 10420
Int. Cl.[4] H01P 5/00; H03H 7/52
U.S. Cl. 333—4 **10 Claims**



1. A combination of an input equipment and an output equipment

said input equipment connecting a first wideband transmission medium to two input terminals of a balanced conductor transmission line, and said output equipment connecting two output terminals of said line to a second wideband transmission medium,

said input equipment being equivalent to a dipole having an input impedance equal to a characteristic impedance of said first and second mediums, and comprising means for separating low frequency signals and high frequency signals carried on said first medium, means for transmitting in differential mode said high frequency signals to said input terminals of said line and means for transmitting in HILO mode said low frequency signals to said input terminals of said line,

said HILO mode consisting in injecting said low frequency signals into said line through said input equipment across a very high impedance and in collecting said low frequency signals transmitted by said line by said output equipment across a very low impedance, and

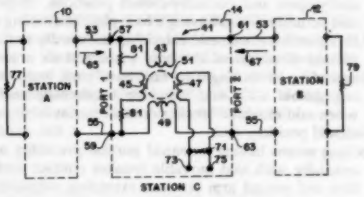
said output equipment being equivalent to a dipole having a constant input impedance which, added to a characteristic impedance of said line, is equal to said characteristic impedance of said first and second mediums, and comprising means for taking the high frequency signals transmitted by said output terminals of said line, means for taking said low frequency signals transmitted by said output terminals of said line, and means for summing said taken high and low frequency signals into wideband signals to be transmitted in said second medium.

4,707,673

DIRECTIONAL COUPLING TRANSFORMER FOR BI-DIRECTIONAL FULL DUPLEX DATA BUS

Kyong Lee, Albuquerque, and Robert H. Maschhoff, Cedar Crest, both of N. Mex., assignors to Gulton Industries, Inc, East Greenwich, R.I.

Filed Jun. 10, 1986, Ser. No. 872,546
Int. Cl.[4] H03H 7/48
U.S. Cl. 333—112 **16 Claims**



1. A directional coupler transformer insensitive to data bus or cable termination failure, for either coupling data signals traveling in a given direction from said data bus to a receiving unit, or from a transmitting unit to said data bus, said directional coupler transformer comprising:

current sensing means connected in series with said data bus for either sensing data signal current from data signals being conducted by said data bus, or for coupling data signals to said data bus, said current sensing means including first and second windings connected in series with first and second conductors, respectively, of said data bus, the sum of the turns of said windings being N_1 turns;

voltage sensing means connected in parallel with said data bus, for either sensing data signal voltages of data signals being conducted by said data bus, or for coupling data signals to said data bus; and

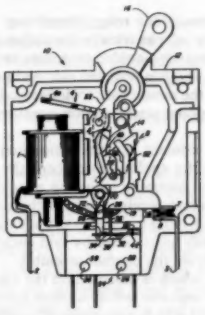
coupling means inductively coupled to said current sensing means and said voltage sensing means, for either coupling data signals from said data bus to a receiving unit, or to said data bus from a transmitting unit.

4,707,674

AUXILIARY SWITCH ACTUATOR MECHANISM

George S. Harper, Cambridge, Md., assignor to Airpax Corporation, Cambridge, Md.

Continuation-in-part of Ser. No. 815,310, Jan. 2, 1986, which is a continuation of Ser. No. 725,486, Apr. 22, 1985, abandoned.
This application Apr. 15, 1986, Ser. No. 852,147
Int. Cl.[4] H01H 75/00, 77/00, 83/00
U.S. Cl. 335—13 **35 Claims**



1. An auxiliary switch actuator mechanism for a circuit breaker having a breaker mechanism including a manually

operable handle, breaker contact means pivotably movable between open and closed positions, collapsible linkage means coupling the handle and movable contact means, means for triggering the collapse of said linkage upon an overcurrent through said breaker, and an auxiliary switch having a contact means movable between normally-open and normally closed positions, said actuator mechanism comprising:

actuator means coupled to said auxiliary switch and movable between first and second positions controlling movement of said auxiliary switch contact means between said normally-open and normally-closed positions, respectively, said actuator means having a base plate containing an open fork portion at one end extending outwardly in the longitudinal direction of the base plate and an arm portion extending at an angle to said base plate and obuttingly engageable with said movable breaker contact means when said movable breaker contact means is moved to its closed position; and

locking means having a central portion pivotably mounted coaxially with said movable breaker contact means, and first and second arm portions extending outwardly from said central portion in different directions, said first arm portion having its distal end portion disposed in said open ended channel of said actuator means and having means for engaging said actuator means when said actuator means is disposed in its second position to lock said actuator means in said second position, and said second arm portion extending into the path of movement of said triggering means when said breaker mechanism is tripped, said second arm portion being pivoted by said triggering means to thereby pivot said first arm portion out of locking engagement with said actuator means.

4,707,675

ELECTROMAGNETIC RELAY

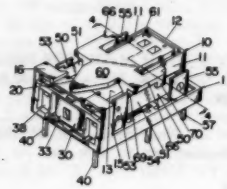
Masanori Motoyama, Matsusaka; Toyotaka Nishikawa, and Masashi Nakagawa, both of Mie, all of Japan, assignors to Matsushita Electric Works, Ltd., Japan

Filed Mar. 28, 1986, Ser. No. 845,634

Claims priority, application Japan, May 20, 1985, 60-108546

Int. Cl.[4] H01H *63/02, 67/02*

U.S. Cl. 335—130 **9 Claims**



1. An electromagnetic relay comprising:

a mount base of electrically insulative material provided with an integrally molded enclosure having a top wall and side walls, said top wall and side walls cooperating with a portion of the mount base to define said enclosure as being of a tunnel-like configuration contiguous around its periphery;

at least one contact assembly mounted on the base outwardly of the enclosure adjacent the side wall thereof, said contact assembly including a movable contact;

an electromagnet received within the enclosure, said electromagnet having a coil means the entire length of which is completely surrounded by said enclosure to be thereby insulated from the contact assembly;

an armature which is mounted on the top wall of the enclosure to be movable within a plane parallel to the plane of the base and which is magnetically coupled to the electromagnet for movement in response to the energization of the electromagnet; and

said armature being provided with at least one card of electrically insulative material which extends sideward over the adjacent side wall of the enclosure to be connected to the movable contact such that the movable contact is driven by the armature for making the switching operation thereof upon energization of the electromagnet.

4,707,676

SUPERCONDUCTING MAGNET

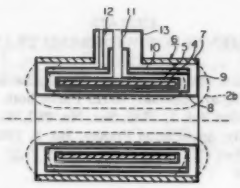
Yosio Saitou; Takeshi Kataoka; Morinki Takechi, and Takahiro Matsumoto, all of Ako, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Continuation-in-part of Ser. No. 816,434, Jan. 6, 1986, abandoned. This application Jun. 4, 1986, Ser. No. 870,376

Claims priority, application Japan, Jan. 1, 1985, 60-242

Int. Cl.[4] H01F *7/22*

U.S. Cl. 335—216 **8 Claims**



1. A superconducting magnet comprising a superconducting coil generating a magnetic field when current flows threrethrough and a vacuum insulation vessel having an outer wall including end and side sections defining a vacuum space, means within the vacuum space for supporting the superconducting coil, and means within the vacuum space and associated with the coil for containing a cryogenic fluid and for maintaining the coil at a cryogenic temperature, said vessel including:

said outer wall which forms a boundary of the vacuum space having a portion of ferromagnetic material surrounding said coil and providing a path of high magnetic permeability for outwardly-directed flux lines of the magnetic field generated by said coil to reduce the spread of the flux lines and weaken the magnetic field outside the vessel.

4,707,677

MULTIPOLAR MAGNETIZATION DEVICE

Claude Oudet, Besancon, France, assignor to Portescap, La Chaux-de-Fonds, Switzerland

PCT No. PCT/CH85/00051, § 371 Date Nov. 29, 1985, § 102(e) Date Nov. 29, 1985, PCT Pub. No. WO85/04512, PCT Pub. Date Oct. 10, 1985

PCT Filed Mar. 29, 1985, Ser. No. 811,837

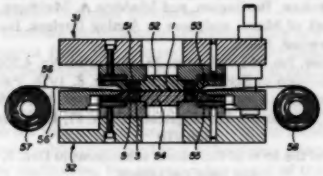
Claims priority, application Switzerland, Apr. 2, 1984, 1673/84; Feb. 21, 1985, 794/85

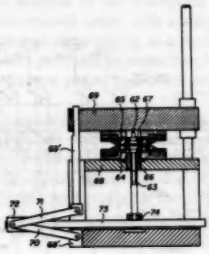
Int. Cl.[4] H01F *7/20*

U.S. Cl. 335—284 **7 Claims**

1. A multipolar magnetization device for forming on opposite plane surfaces of a flat magnetizable portion of a body a series of magnetized zones, comprising: a frame; two support parts mounted on said frame, said support parts being made of a material of high magnetic permeability and having substantially plane polar surfaces, respective plane polar surfaces of said support parts being arranged in spaced relation parallel to and facing each other, at least one of said support parts being coupled magnetically with a set of elongated portions of electric conductors so as to generate a series of magnetic fields between said plane polar surfaces of said support parts facing each other; and means for displacing at least one of said support parts in relation to the other and in relation to said frame in a direction perpendicular to said plane surfaces of said support parts, so as to permit said plane polar surfaces to be moved

relative to each other towards or away from opposite plane surfaces of a flat body portion to be magnetized when such





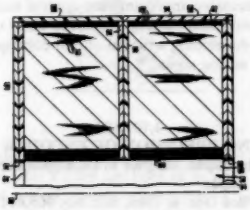
body portion is disposed between said plane polar surfaces of said support parts.

4,707,678

CONSOLIDATED MAGNETIC CORE CONTAINING AMORPHOUS METAL

Jaime E. Siman, Watkinsville, Ga., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 699,378, Feb. 7, 1985, Pat. No. 4,648,929.
This application Sep. 22, 1986, Ser. No. 909,651
Int. Cl.[4] H01F *27/24*
U.S. Cl. 336—210 **7 Claims**



1. A magnetic core, comprising:

a plurality of lamination layers, at least certain of which are constructed of amorphous metal,

said plurality of lamination layers defining closely adjacent edges on opposite sides of the magnetic core,

and a composite, conformal coating disposed to cover at least said opposite sides of said magnetic core,

said composite, conformal coating including a low stress, adhesive insulative structure having at least one foraminous insulative sheet thoroughly impregnated with a first gelled resin,

said low stress insulative structure being bonded to the adjacent edges of the lamination layers on said opposite sides of the magnetic core, without penetration of the low stress insulative structure between the lamination layers,

said composite, conformal coating further including a high strength structure having at least one reinforcing insulative sheet thoroughly impregnated with a second resin which has a higher tensile strength than said first resin,

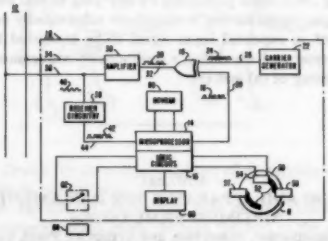
said high strength structure being bonded to said low stress insulative structure, to provide a composite, conformal coating which protects the magnetic core against mechanical stresses while maintaining the desired core configuration.

4,707,679

MAGNETIC TAMPER DETECTOR

Jerry M. Kennon, and Leland E. Hayden, both of Raleigh, N.C., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 663,254, Oct. 22, 1984, abandoned.
This application Feb. 2, 1987, Ser. No. 11,364
Int. Cl.[4] H04M *11/04*; G08B *23/00*
U.S. Cl. 340—310 A **8 Claims**



1. An electric meter, for detecting magnetic tampering comprising:

a magnetically sensitive switch;

first means for sensing the status of said switch, said sensing means being connected in electrical communication with said switch;

first means for storing a first signal representative of the occurrence of an activated status of said switch;

second means for sensing the occurrence of a predefined activity, said predefined activity occurring externally of said electric meter;

second means for storing a second signal representative of said occurrence of said predefined activity;

said first sensing means being connected in signal communication with said second sensing means; and

means for communicating said first and second signals to a remote device, said communicating means being associated in signal communications with said first and second storing means.

4,707,680

SAMPLE ISOLATION IN INTEGRATING ANALOG-TO-DIGITAL CONVERTERS

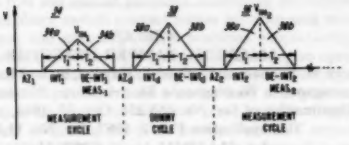
Bryan L. Sparrowhawk, Everett, Wash., assignor to John Fluke Mfg. Co., Inc., Everett, Wash.

Filed Mar. 4, 1986, Ser. No. 836,121
Int. Cl.[4] H03M *1/52*
U.S. Cl. 340—347 NT **11 Claims**

1. In an integrating analog-to-digital converter for measuring successive discrete input signals using conversion cycles each comprising (a) integrating the input signal for a predetermined fixed first time period to obtain an integrated input signal and (b) de-integrating said integrated input signal toward a reference input signal; measuring a de-integration time for de-integrating the integrated input signal to a reference level intermediate said input signal and said reference signal and correlating said de-integration time to an input signal magnitude, wherein an input stage of said converter to which said input signals are successively applied is a metal-oxide-silicon linear amplifier having an input gate oxide that as

a result of ionic contamination and other effects has a tendency to exhibit crosstalk between successive input signal measurements:

a method of reducing said crosstalk comprising, between successive input signal measurements, the steps of "exercising" said input gate oxide by applying to said amplifier an input signal having a magnitude substantially equal to that of an expected input signal to be measured by said converter and executing a preliminary conversion cycle consisting of (a) and (b).



4,707,681

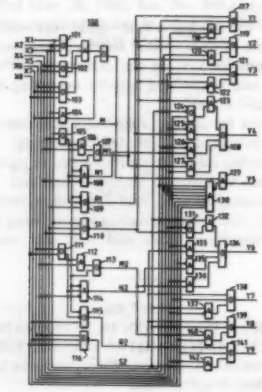
METHOD AND APPARATUS FOR IMPLEMENTING OPTIMUM PRML CODES

John S. Eggenberger, Sunnyvale, and Arvind M. Patel, San Jose, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 24, 1986, Ser. No. 855,641

Int. Cl.[4] H03M *7/00*

U.S. Cl. 340—347 DD **18 Claims**



1. Apparatus for encoding a preselectable number of bits of binary data into codewords having a preselectable number of bits, said apparatus comprising:

receiver means for receiving the binary data; and

encoder means, coupled to the receiver means, for producing sequences of fixed length codewords;

said sequences having no more than a first preselected number of consecutive zeroes therein; and

said sequences comprising two subsequences, one consisting only of odd bit positions and another consisting only of even bit positions, each of said subsequences having no more than a second preselected number of consecutive zeroes therein.

4,707,682

A-TO-D CONVERTER OF THE SUCCESSIVE-APPROXIMATION TYPE

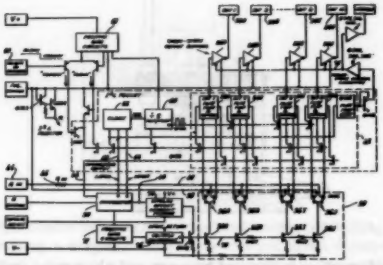
Adrian P. Brokaw, Burlington, and Modesto A. Maidique, Lexington, both of Mass., assignors to Analog Devices, Incorporated, Norwood, Mass.

Division of Ser. No. 361,740, Mar. 25, 1982, Pat. No. 4,556,870, which is a division of Ser. No. 931,960, Aug. 8, 1978, Pat. No. 4,400,689, which is a continuation-in-part of Ser. No. 785,322, Apr. 7, 1977, abandoned. This application Sep. 27, 1985, Ser. No. 780,916

The portion of the term of this patent subsequent to Dec. 3, 2002, has been disclaimed.

Int. Cl.[4] H03M *1/38*

U.S. Cl. 340—347 AD **1 Claim**



1. An analog-to-digital converter comprising substrate means forming a single monolithic integrated-circuit chip including:

a pluarlity of normal mode transistor current sources formed in said substrate means and individually controllable to produce respective binarily-weighted currents for summation into a composite signal;

I^2L inverted mode transistor means formed in said substrate means including circuit means defining successive-approximation control means capable of carrying out a successive-approximation algorithm; and

transistor switch means on said substrate means responsive to said successive-approximation control means and serving to control said current sources to carry out said algorithm for developing a digital output corresponding to an unknown analog signal.

4,707,683

INCREASING PRECISION OF ENCODER OUTPUT

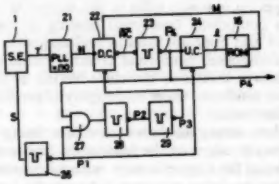
Koji Yao, Kyoto, Japan, assignor to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan

Filed Dec. 6, 1985, Ser. No. 805,611

Claims priority, application Japan, Dec. 6, 1984, 59-258810

Int. Cl.[4] H03M *1/30*

U.S. Cl. 340—347 P **20 Claims**



1. A method of increasing precision of a position signal by

processing a pulse signal obtained by multiplying an output pulse signal of a subject encoder comprising the steps of:

(a) revolving a subject encoder coaxially with a reference encoder of higher precision:

(b) counting the number of reference pulses in a pulse signal output from the reference encoder corresponding to a predetermined cycle of a pulse signal output from the subject encoder;

(c) for every unit movement length of an object connected to the subject encoder, determining the number of reference pulses comprised in a pulse signal interval obtained by multiplying the output pulse signal of the subject encoder by a multiplier, said interval corresponding to a unit movement length, determining the multiplier so that each pulse interval of the multiplied pulse signal is within a predetermined range with respect to the unit movement length and determining as a sequence of divisors a set of numbers provided as respective functions of said numbers of reference pulses in a corresponding sequence of intervals;

(d) storing the divisors in a data storage means; and

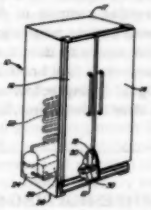
(e) in operation of the subject encoder, obtaining a corrected output pulse signal corresponding to each unit movement length of the object by dividing the frequency of the multiplied pulse signal of the subject encoder by divisors successively read out from said data storage means.

4,707,684

ALARM FOR A REFRIGERATOR

Donald E. Janke, Benton Township, Berrien County, and William J. Linstromberg, Lincoln Township, Berrien County, both of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Dec. 18, 1985, Ser. No. 810,856
Int. Cl.[4] G08B *23/00, 17/00*
U.S. Cl. 340—530 **18 Claims**



8. A door ajar alarm for producing an output at a particular repetition rate after a door has been in an open position for a predetermined period of time, comprising:

an oscillator comprising a capacitor in series with an indicating device and energy transfer means, said energy transfer means periodically transferring energy stored in the capacitor to the output device as a series of pulses at a repetition rate determined in part by the capacitance value of the capacitor;

charging means for charging said capacitor;

said oscillator operative to produce an output only when the voltage across said capacitor exceeds a predetermined magnitude, the rate of voltage increase across the capacitor due to charging thereof being determined in part by the capacitance value of the capacitor;

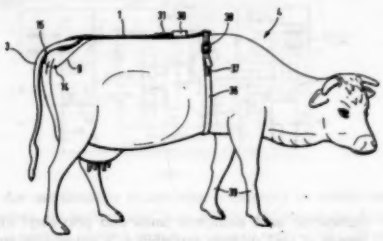
said capacitance value being preselected so that a delay period occurs after the door has been placed in an open position before the alarm output is produced, such delay period being much greater than the interval between pulses.

4,707,685

DEVICE FOR DETECTING THE ONSET OF PARTURITION OF A PREGNANT ANIMAL

Denis Carrier, C.P. 186, Rang Petit Nedelec, Notre-Dame-Du-Nord, Quebec, Canada (J0Z 3B0), and Andre Saintonge, Judge, Canada, assignors to Denis Carrier, Notre-Dame-Du-Nord, Canada

Filed Jul. 30, 1986, Ser. No. 890,542
Claims priority, application Canada, Nov. 13, 1985, 495253
Int. Cl.[4] G08B *23/00*; A61B *5/10*
U.S. Cl. 340—573 **19 Claims**



1. A device for detecting the onset of parturition of a pregnant animal, comprising:

a thin, electrically conducting wire passing through a first perforation point made through the skin of the animal on the left side of the animal's vulva region, and also passing through a second perforation point made through the skin of the animal on the right side of the animal's vulva region, said thin, electrically conducting wire comprising a middle wire portion defined between said first and second perforation points and lying substantially across the vaginal orifice of the animal, said thin wire also comprising a first end, a second end, a first end portion defined between said first end and said first perforation point, and a second end portion defined between said second end and said second perforation point;

first stopper means fixedly mounted on the first end portion of said thin wire close to the first perforation point, and second stopper means fixedly mounted on the second end portion of said thin wire close to the second perforation point, said first and second stopper means defining a central portion of said thin, electrically conducting wire, which central portion includes said middle wire portion, and said first and second stopper means causing, upon separation of the left and right sides of the animal's vulva region at the onset of parturition of the animal, a tensile stress into said central portion of the thin, electrically conducting wire in order to break said thin wire central portion; and

means for detecting breaking of said central portion of the thin, electrically conducting wire to thereby detect the onset of parturition of said animal.

4,707,686

OVER TEMPERATURE SENSING SYSTEM FOR POWER CABLES

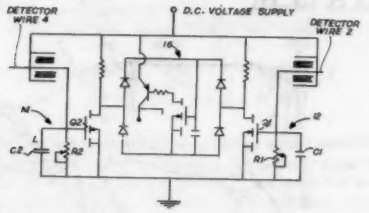
Milton S. Greenhalgh, Fairfield, Conn., assignor to General Electric Company, Bridgeport, Conn.

Filed Apr. 3, 1986, Ser. No. 847,481
Int. Cl.[4] G08B *17/02*
U.S. Cl. 340—596 **4 Claims**

1. An assembly which comprises an over temperature sensing device adapted to monitor, detect, alarm and otherwise respond to an over temperature condition and a single or multiwire conductor, comprising:

(a) a sensing wire contiguous to and coextensive with a power cable comprising a single or multiwire conductor within a protective jacket, said sensing wire having a first

detector wire and a second detector wire both of which are connected to an electric power source said first and second detector wires being uniformly spaced apart over their full lengths by a thermal-sensitive polymeric material selected from the group consisting of nylon polyamide resin, polyvinyl chloride, cellulose esters, cured acrylonitrile butadiene rubber containing at least one per cent acrylonitrile and substantially no sulfur, cured acrylonitrile butadiene rubber containing at least 0.5 per cent



carboxylic acid monomer units and polyvinyl chloride blends of said rubbers extruded as a cover concentric to and coextensive with said first detector wire;

(b) a solid state control device having two terminals in electrical circuit with said power cable and means for continuously monitoring and displaying changes in electrical resistance through said thermal-sensitive cover; and

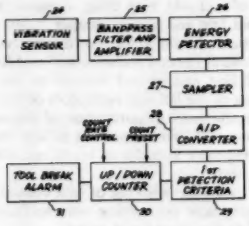
(c) alarm emans operatively connected to said solid state control device for identifying an over-temperature condition in said power cable.

4,707,687

DETECTOR TO DISCRIMINATE BETWEEN TOOL BREAK ACOUSTIC SIGNATURES AND SPIKY NOISE

Charles E. Thomas, Scotia, and William S. Yerazunis, Troy, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed May 5, 1986, Ser. No. 859,533
Int. Cl.[4] B08B *21/00*
U.S. Cl. 340—680 **9 Claims**



1. A system to detect cutting tool breakage while machining a workpiece comprising:

a vibration sensor to be mounted on a machine tool with good coupling to sense vibrations at the cutting tool-workpiece interface and generate a signal;

an analog preprocessor having means for filtering out lower frequency machinery noise, detecting the signal energy, and outputting a cutting noise vibration signal in a band of frequencies above 30 kHz but below 100 kHz;

a digital processor comprised of means for sampling the latter and converting samples to digital form, and for computing a mean cutting noise signal; and

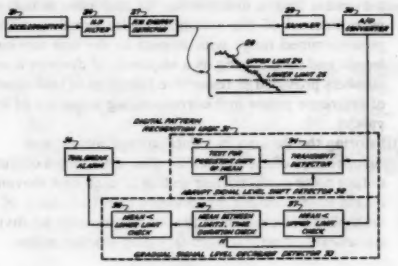
means for discriminating between spiky noise and a tool break acoustic signature composed of a dense cluster of noise spikes on the basis of lower spike density of the first, by testing said samples against signal amplitude detection criteria and generating a tool break alarm when the samples meeting the criteria exceed those failing the criteria by a preset number.

4,707,688

DETECTION OF TOOL BREAKS THAT CAUSE SLOWLY DECREASING CUTTING NOISE

Charles E. Thomas, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 3, 1986, Ser. No. 835,698
Int. Cl.[4] G08B *21/00*
U.S. Cl. 340—680 **10 Claims**



1. A machine tool monitor to detect gradually occurring cutting tool breakage comprising:

a broadband vibration sensor which generates a signal corresponding to vibrations at the cutting tool-workpiece interface;

an analog preprocessor having means to filter out lower frequency machinery noise and detect the signal energy, and output a cutting noise vibration signal in a frequency band below 100 kHz;

a digital processor comprised of means for sampling the latter and converting samples to digital values, and for computing a mean cutting noise signal; and

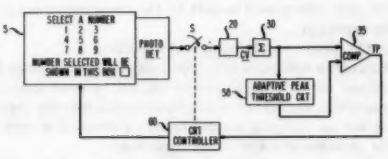
pattern recognition means to detect a gradual signal level decrease and generate a tool break alarm upon said mean cutting noise signal falling below an upper check signal level limit and, after a preset time, crossing a lower check limit.

4,707,689

ADAPTIVE THRESHOLDING SCHEME FOR OPTICALLY-BASED TOUCH SCREENS

Philip S. DiPiazza, Morganville; Dale E. Lynn, Freehold, and Donald J. Weber, Shrewsbury, all of N.J., assignors to AT&T Information Systems Inc. American Telephone & Telegraph Company, Murray Hill, N.J.

Filed Mar. 25, 1985, Ser. No. 715,278
Int. Cl.[4] G09G *1/16*
U.S. Cl. 340—706 **11 Claims**



1. An adaptive thresholding circuit for use with an optically-based touch screen of the type which is overlaid on the face of a display, said display being used to display a plurality of touch

targets, said targets being respective sources of signals, said circuit comprising:

means for receiving signals from said plurality of targets,

means for establishing a single threshold for said targets based on the levels of said signals as they are received from said plurality of targets over a predetermined period of time, and

means for comparing said threshold with the level of ones of said signal received from said plurality of targets over a subsequent period of time, and for generating a predetermined signals for each of said ones of said subsequently received signals that exceeds said threshold.

4,707,690

VIDEO DISPLAY CONTROL METHOD AND APPARATUS HAVING VIDEO DATA STORAGE

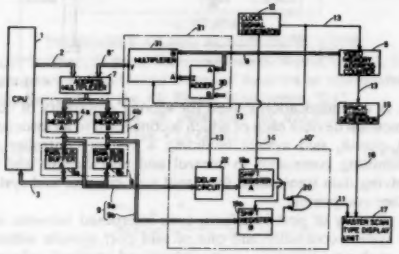
Keizo Higuchi, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 19, 1984, Ser. No. 633,430

Claims priority, application Japan, Nov. 29, 1983, 58-227201

Int. Cl.⁴ G09G *1/16*

U.S. Cl. 340—750 **8 Claims**



1. A video display control apparatus, comprising:

video data memory means for storing a plurality of pieces of video data to be displayed on the screen of a raster scan type display unit, said display unit providing a display formed of repetitive raster scan operations,

clock signal generating means for generating a clock signal,

video memory address signal generating means coupled to said clock signal generating means for generating a video address signal for reading, consecutively in the scanning order of said screen, said plurality of pieces of video data stored in said video data memory means, and

video memory address converting means coupled to said video memory address signal generating means and said clock signal generating means for converting said video memory address signal from said video memory address signal generating means for reading, from said video data memory means in a time shared manner, said plurality of pieces of video data to be displayed in the interval of each said raster scan operation,

said video memory address signal generating means comprising:

adder means coupled to said video memory address signal generating means for adding a predetermined offset address signal corresponding to a dimension along a scan line greater than one pixel to said video memory address signal for providing an offset address added video memory address signal, and

multiplexer means coupled to said clock signal generating means for switching said memory address signal obtained from said video memory address signal generating means and said offset address added video memory address signal for continuously providing said address signal and offset added address signal alternately in a time shared manner synchronously with scanning of the screen of said display unit.

4,707,691

OSCILLOSCOPE

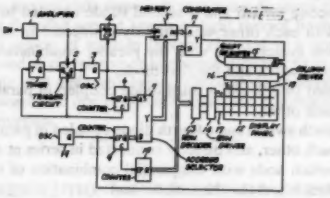
Hisao Hammura, Kumagaya; Tetsuro Echizen, and Yoshio Sanada, both of Okabe, all of Japan, assignors to Shin-Kobe Electric Machinery Co. Ltd., Tokyo, Japan

Filed Apr. 23, 1984, Ser. No. 602,802

Claims priority, application Japan, Apr. 26, 1983, 58-73450

Int. Cl.⁴ G09G *3/00*

U.S. Cl. 340—754 **4 Claims**



1. An oscilloscope comprising a memory in which waveform data are written and from which said wafeform data are read, a writing control circuit to control writing of said waveform data to said memory, said waveform data being written at differing frequencies, a reading control circuit to control reading of said waveform data from said memory and a matrix-type display means for displaying said read waveform data, characterized by a writing prohibition means in said writing control circuit to establish a certain writing prohibition period after all the data of one waveform have been written in said memory for waveform data written at all frequencies and to establish a minimum uniform length writing period for each data of said one waveform, and to establish a reading period control during writing of said waveform data in said reading control circuit to establish a longer reading period as the writing frequency becomes lower for said waveform data, said longer reading period occurring between each minimum uniform length writing period.

4,707,692

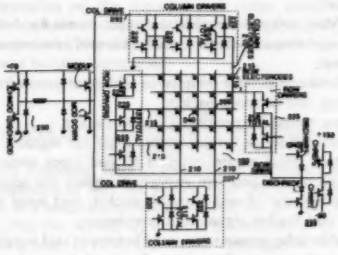
ELECTROLUMINESCENT DISPLAY DRIVE SYSTEM

Marvin L. Higgins, Corvallis; Bill Eaton, Albany; Eugene A. Cooper, Scio, and Clifford B. Cordy, Jr., Corvallis, all of Oreg., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Nov. 30, 1984, Ser. No. 677,112

Int. Cl.⁴ G09G *3/30*

U.S. Cl. 340—805 **10 Claims**



1. A display drive system for driving a display having a matrix of pixels addressed by a plurality of column and row electrodes, said display drive system comprising:

a column multiplexer having a column drive input signal line and a plurality of column drive output signal lines, said

plurality of column drive output signal lines coupled to the plurality of column electrodes; and

column drive means coupled to the column drive input signal line for forming a resonant tank with the plurality of column electrodes and for driving the pluralilty of column electodes with pulses of current started and stopped at ½ wavelength intervals of the resonant period Lambda of the resonant tank, the column drive means having

a first switch and a first diode coupled in parallel with each other,

a second switch and a second diode coupled in parallel with each other, and directly connected in series at a first switch node with the parallel combination of the first switch and the first diode,

a third switch and a third diode coupled in parallel with each other,

a fourth switch and a fourth diode coupled in parallel with each other, and directly connected in series at a second switch node with the parallel combination of the third switch and the third diode, and

an inductor coupled between the first and second switch nodes.

4,707,693

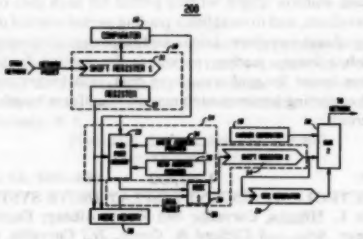
THROUGH-TRAFFIC PRIORITY PROTOCOL IN A COMMUNICATIONS SYSTEM

Steven R. Hessel, Campbell, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jun. 13, 1984, Ser. No. 620,236

Int. Cl.[4] H04Q *5/00*; **H04J** *3/00, 3/24*

U.S. Cl. 340—825.51 **2 Claims**



1. A communications system for receiving and retransmitting a network packet and for transmitting a local packet comprising:

an input means for receiving and holding an entire network packet;

a verifying means coupled to said input means for determining an absence of network packets in said communications system;

an address comparator coupled to said input means for identifying said network packet;

a source means for providing a local packet;

a pattern generator for generating a marker signal;

an output select means coupled to said input means, said source means, and said pattern generator for selectively coupling one of said network packet, said local packet, and said marker signal for transmission;

a variable delay means interposed betweens said input means and said output select means for receiving said network packet and for delaying said network packet by a predetermined amount; and

an output holding means coupled at its input to said delay means and to said source means and coupled at its held output to said output select means for selectively holding an entire network packet or an entire local packet.

4,707,694

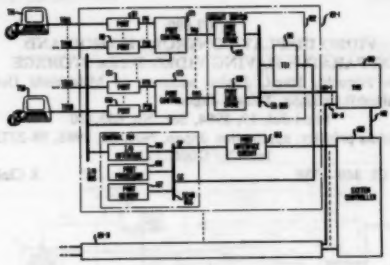
TELEPHONE SYSTEM PORT COMMUNICATION METHOD AND APPARATUS

David L. Bauer, Thornton; Larry D. Bowyer, Boulder; David M. Ruby, Aurora, and Richard A. Windhausen, Thornton, all of Colo., assignors to American Telephone and Telegraph Company, New York, N.Y. and AT&T Information Systems Inc., Morristown, N.J.

Continuation of Ser. No. 585,833, Mar. 2, 1984, abandoned. This application Jun. 6, 1986, Ser. No. 873,139

Int. Cl.[4] H04Q *1/00*

U.S. Cl. 340—825.52 **22 Claims**



1. A communication system for serving a plurality of communication devices each of which is connected to an associated port circuit, said system including a system controller for transmitting commands to control said port circuits and for receiving data transmitted from said port circuits, said system further comprising

a plurality of port interfaces each interposed between said system controller and one of said port circuits wherein each port interface sends a command received acknowledgement signal in response to a received interface command from said system controller requesting data from an associated port circuit and wherein each port interface sends said data as an interface response to a subsequent read command from said system controller and

said system controller including

first means for transmitting a separate interface command to each of a preselected number of said port interfaces in a predetermined order and for receiving a separate command received acknowledgement signal from each of said preselected number of said port interfaces and

second means operational after said first transmitting means for transmitting a separate read command to each of said preselected number of said port interfaces in said predetermined order and for receiving a separate interface response from each of said preselected number of said port interfaces.

4,707,695

MAGNETIC POSITION SENSOR

Tadashi Takahashi; Kunio Miyashita, and Syoichi Kawamata, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 5, 1983, Ser. No. 510,914

Claims priority, application Japan, Jul. 2, 1982, 57-113928

Int. Cl.[4] G08C *19/06*

U.S. Cl. 340—870.31 **20 Claims**

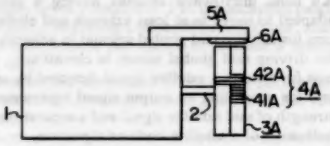
1. A magnetic position sensor comprising:

a moving member having an encoder track and a reference track, said encoder track being composed of consecutive N poles and S poles arranged alternately on said moving member, and said reference track being adjacent to said encoder track and including at least one pair of N and S poles arranged on said moving member;

a first magnetic detector having a first pair of magnetic pickup means which is close to and confronts with said reference track and a second pair of magnetic pickup

means which is close to and confronts with said encoder track, said first and second pairs of magnetic pickup means including means for jointly producing a reference signal as said moving member moves; and

a second magnetic detector having a third pair of magnetic



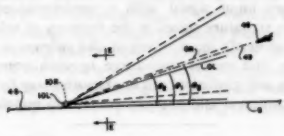
pickup means which is close to and confronts with said encoder track, said second magnetic detector producing an encoder signal based on said consecutive N poles and S poles as said moving member moves so as to detect the movement position of said moving member according to said reference signal.

4,707,696

PORTABLE GLIDE SLOPE INDICATOR

Harry L. Task, Dayton, Ohio, and Ivan S. Wyatt, Gilbert, Ariz., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 29, 1986, Ser. No. 823,872
Int. Cl.[4] G08G 5/00
U.S. Cl. 340—954 **7 Claims**



1. A system for providing glide path information to an aircraft comprising:

(a) first and second glide slope indicators for positioning near ground level near respective first and second sides of an aircraft runway, each of said first and second glide slope indicators including.

(i) a housing having a first end and a second end;

(ii) means defining an optical window in said housing at said first end thereof;

(iii) first and second light sources mounted within said housing near said second end thereof, the first light source being mounted in preselected vertical spaced relationship above the second light source, each of said first and second light sources being spaced a preselected distance from said optical window so as to project respective substantially well defined first and second beams of light of preselected angular divergences and overlap from said housing through said optical window;

(iv) a controllable source of power operatively connected to said first and second light sources for selectively energizing said first and second light sources; and

(v) electrical means interconnecting said power source and said first light source for controllably flashing said first light source, whereby each of said first and second glide slope indicators presents a first blinking beam of light and a second steady beam of light;

(b) said first and second glide slope indicators being disposed to project respective first and second beams of light in generally the same direction relative to said aircraft runway;

(c) the first glide slope indicator being disposed to project said first and second beams of light thereof having a first region of overlap thereof elevated at a preselected first angle relative to horizontal; and

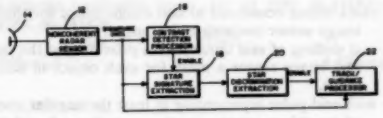
(d) the second glide slope indicator being disposed to project said first and second beams of light thereof having a second region of overlap thereof elevated at a preselected second angle relative to horizontal different from said first angle, said glide path being defined along an angle defined between said first region of overlap and said second region of overlap.

4,707,697

HIGH RESOLUTION NONCOHERENT RADAR IMAGER

Thomas R. Coulter, Ontario, Calif.; Philip O. Isaacson, Chanhassen, and Edwin C. Thiede, Plymouth, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed May 2, 1986, Ser. No. 858,812
Int. Cl.[4] G01S 13/89
U.S. Cl. 342—25 **9 Claims**



1. Apparatus for extracting one-dimensional, high-resolution information from radar return signals, comprising:

(a) non-coherent pulse radar means for transmitting N sequential signals of differing frequency at predetermined time intervals toward a given target area of interest from one radar location;

(b) non-coherent radar receiver means positioned to receive, detect and range gate the composite radar return signal samples of N differing frequencies reflected from a plurality of point scatterers located in said area of interest, wherein N is an integer greater than or equal to the ratio of radar pulse length to range resolution capability;

(c) means for detecting the varying D.C. interference signal of said radar return signal samples from stationary targets occasioned by the differing frequencies at one radar location; and

(d) means for performing a one-dimensional Fourier transformation on the detected and range gated composite non-coherent radar return signal samples of N different frequencies whereby high resolution target signature features become detectable.

4,707,698

COORDINATE MEASUREMENT AND RADAR DEVICE USING IMAGE SCANNER

James N. Constant, 1603 Danbury Dr., Claremont, Calif. 91711

Continuation of Ser. No. 40,171, May 18, 1979, abandoned, which is a continuation-in-part of Ser. No. 897,907, Apr. 19, 1978, Pat. No. 4,164,740, which is a continuation of Ser. No. 663,847, Mar. 4, 1976, abandoned. This application Aug. 28, 1980, Ser. No. 182,470
Int. Cl.[4] G01S 13/00; G01C 3/00; G03H 3/00; H04N 13/00
U.S. Cl. 342—179 **13 Claims**

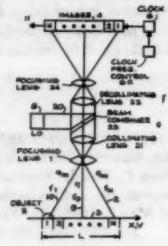
1. In a system for measuring spatial coordinates, the improvement comprising:

focusing means for acoustical or electromagnetic energy for focusing a receiving beam,

with said receiving beam providing for viewing an object scene;

an image sensor having as input the output of said focusing means for detecting signals from objects in said object scene;

said signals representing one of illuminations or radiations of said objects, said image sensor having a plurality of elements, each element for receiving a substantial portion of the signal from an object at known angular coordinate and providing an electric charge signal in response to an input signal, and including means for shifting a charge signal from an element;



clock means connected to said image sensor for shifting the image sensor contents to its output,

said shifting of said clock means providing at the output of said image sensor a pulse for each object in said object scene,

with said pulse representing at least the angular coordinate of its object relative to the centerline of said focusing means; and

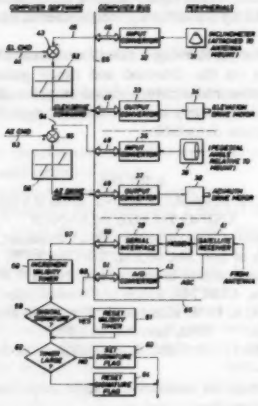
data processor means having as input the output of said image sensor for measuring the angle of objects.

4,707,699

METHOD AND APPARATUS FOR POSITIONING A SATELLITE ANTENNA FROM A REMOTE WELL LOGGING LOCATION

Robert L. Toellner, and George V. Copland, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Feb. 14, 1985, Ser. No. 701,721
Int. Cl.[4] H04B 7/185
U.S. Cl. 342—352 **4 Claims**



1. An automatic system for positioning a Ku band microwave antenna accurately to within approximately 0.1 degrees to point at a particular satellite located among others having as close as 2 degree angular spacing in geosynchronous earth orbit from a remote location for establishing a Ku band microwave communication link from the remote location via the satellite, comprising:

a Ku band microwave antenna having a gimbal mount adapted to move in at least azimuth and elevation;

means for driving said gimbal amount in azimuth and means for driving said gimbal mount in elevation;

means for sensing a satellite signal detected by said antenna and for producing an output signal representative of the strength of said satellite signal and a separate output signal indicative of a satellite code or signature;

inclinometer means for measuring the actual elevation angle of said elevation gimbal with respect to vertical and for generating an output signal representative thereof;

means for measuring the azimuth angle of said azimuth gimbal relative to a fixed reference and for generating an output signal representative thereof;

computer means capable of receiving input data comprising the earth latitude and longitude of a remote location and a satellite position and capable of receiving as inputs said strength representative signal, said satellite code or signature indicative signal, said elevation representative signal and said azimuth representative signal and further being capable of generating output command signals to said driving means to drive said azimuth and elevation gimbals to commanded positions the initial commanded position of said azimuth gimbal being one of its stops;

means, included in said computer means, for pointing said elevation gimbal to a fixed direction and for scanning said azimuth gimbal to a computed direction based on said earth latitude and longitude and said satellite position signals and then for varying the pointing of said gimbals in response to said signal strength signal in such a manner as to optimize said strength signal; and

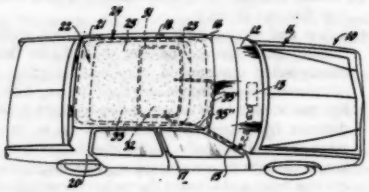
wherein said computer means further includes means capable of receiving said input signal indicative of a satellite code or signature and means for comparing said code or signature input signal with a predetermined reference code or signature signal in the memory of said computer means to verify the pointing of said antenna at the correct satellite and means responsive to such comparison for moving said gimbal mount in azimuth away from its initial stop position if said comparison fails to match.

4,707,700

VEHICLE ROOF MOUNTED SLOT ANTENNA WITH LOSSY CONDUCTIVE MATERIAL FOR LOW VSWR

Louis L. Nagy, Warren, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 25, 1986, Ser. No. 889,182
Int. Cl.[4] H01Q 1/32
U.S. Cl. 343—712 **3 Claims**



1. Slot antenna apparatus for a motor vehicle comprising, in combination:

a vehicle body comprising an electrically conducting material and having a lower body portion, a plurality of vertical pillars defining window openings and a horizontal roof

portion with a central portion made of electrically non-conducting material;

a horizontal sheet of electrically conducting material attached to the roof portion, the horizontal sheet including a looped slot adjacent the central portion of the roof portion dividing the sheet into inner and outer portions, the slot having a total loop length of substantially one wavelength in the commercial FM broadcasting band, the sheet further comprising a material having a sheet conductivity of 1 to 2 ohms per square to produce a maximum VSWR of 5;

antenna feed means connected to the inner portion of the horizontal sheet at its front center relative to the vehicle body; and

means effective to ground the antenna to the vehicle body at DC and at radio frequencies in the commercial AM and FM bands.

4,707,701

AUTOMOBILE ANTENNA SYSTEM

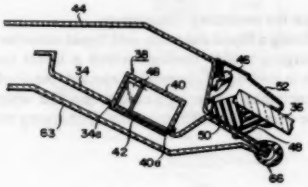
Junzo Ohe, and Hiroshi Kondo, both of Aichi, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Oct. 25, 1985, Ser. No. 791,525

Claims priority, application Japan, Oct. 26, 1984, 59-226397

Int. Cl.[4] H01Q *1/32*

U.S. Cl. 343—712 **7 Claims**



1. An automobile antenna system for detecting surface high-frequency currents which are induced on a vehicle body and concentrated into the marginal edge of the vehicle body, said antenna system comprising a high-frequency pickup longitudinally disposed along and in close proximity with the marginal edge portion of the vehicle body, said high-frequency pickup being spaced away from the marginal edge of the vehicle body within a range represented by the following formula:

$$12\times10^{-3}c/f(m)$$

where c=the velocity of light and f=the carrier frequency of broadcast waves.

4,707,702

CIRCULARLY POLARIZING ANTENNA FEED

Michael J. Withers, Bordon, England, assignor to National Research Development Corporation, London, England

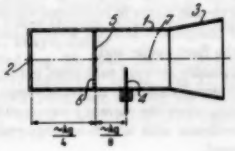
Filed Jan. 13, 1986, Ser. No. 818,546

Claims priority, application United Kingdom, Jan. 21, 1985, 8501440

Int. Cl.[4] H01Q *19/00*

U.S. Cl. 343—786 **12 Claims**

1. A circularly polarizing feed for a microwave antenna, said feed comprising a horn having an aperture end and a throat end, and a feed waveguide extending axially from said throat end of said horn, said feed waveguide including a co-axial launching probe projecting radially into said feed waveguide for exciting linearly polarized plane waves which propagate in opposite directions axially along said waveguide, a wave splitter including a reflecting portion, said reflecting portion extending across said waveguide at a distance of substantially λ/8 (where λ is the wavelength in said waveguide at a mean operating frequency) behind said co-axial launching probe with respect to said horn and being inclined at an angle of 45± to the polarization direction of said linearly polarized plane waves excited by said co-axial launching probe, said angle



being measured in a plane perpendicular to said waveguide axis, and a terminal reflecting plane located behind said wave splitter at a distance to substantially λ/4 from said reflecting portion of said wave splitter.

4,707,703

METHOD OF PERFORMING THERMAL MULTICOLOR PRINTING

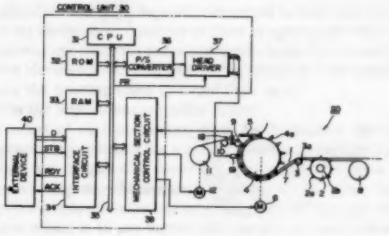
Akikazu Toida; Satoshi Iwata; Fumio Takahashi, all of Ise, and Takanobu Mimura, Mie, all of Japan, assignors to Shinko Electric Co., Ltd., Tokyo, Japan

Filed Jul. 8, 1986, Ser. No. 883,127

Claims priority, application Japan, Jul. 10, 1985, 60-151827; Jul. 10, 1985, 60-151828

Int. Cl.[4] G01D *15/10*

U.S. Cl. 346—1.1 **4 Claims**



1. A method of thermally printing a multicolor image on a print paper in accordance with image data stored in memory means comprising the steps of:

(a) setting an ink ribbon over a platen roller with the print paper being interposed therebetween, the ink ribbon having plural groups of ink zones of the same length, the ink zones of each group carrying in a predetermined order a predetermined number of heat-dissolving inks of predetermined different colors, respectively, said ink zones being spaced from one another along a length of said ink ribbon by a predetermined distance;

(b) subsequently positioning one of said ink zones in one of the groups at a printing position where a thermal head is in contact with said platen roller through said ink ribbon and print paper;

(c) subsequently activating said thermal head in accordance with the image data and advancing said ink ribbon and print paper to transfer the ink of said one of the ink zones onto the print paper so that one of color component images constituting the multicolor image is printed on the paper;

(d) subsequently advancing said ink ribbon and print paper by a predetermined distance at the same speed to separate said paper from the ink ribbon adhered to the paper by the dissolved ink;

(e) then, backwardly moving said print paper by a distance

equal in length to the total advance of said paper in the steps (c) and (d);

(f) cyclicly carrying out the steps (b) to (e) with respect to the other ink zones in said one of the groups of ink zones to print the other color component images of the multicolor image on said paper in registered relation to said one of the color component images, without carrying out the step (e) in the final cycle; and

(g) then, backwardly moving said print paper by a distance substantially equal in length to the advance of said paper in the step (d), when the memory means still stores image data in accordance with which another multicolor image is to be printed.

4,707,704

CONTROL SYSTEM AND METHOD FOR HANDLING SHEET MATERIALS

David Allen, Worcester, Mass., and Arthur Cleary, Derry, N.H., assignors to Advanced Color Technology, Inc., Cambridge, Mass.

Filed May 9, 1986, Ser. No. 861,264

Int. Cl.[4] G01D *9/00;* **G03G** *15/00;* **H04N** *1/22*

U.S. Cl. 346—24 **11 Claims**

1. In an ink jet printer for producing imaged sheets of a predetermined length having

an imaging drum, and

a supply of sheet material within said drum,

sheet material control means comprising

first and second rollers carried by said drum, said sheet material extending around the exterior of said drum and thence between said first and second rollers,

reversible drive means coupled to said rollers for operating in a forward direction to draw said sheet material from within said drum around the exterior thereof and thence away from said drum, and operating in a reverse direction to withdraw said sheet material toward said drum,

cutter means spaced from said drum and arranged to receive and shear sheet material ejected from said drum,

distance measuring means responsive to movement of said sheet material,

means energizing said drive means to move said sheet material, and

means under the control of said distance measuring means arranged to stop said drive means when said sheet material has moved a predetermined distance approximately equal to the said predetermined length of one of said imaged pages plus the distance between the surface of said drum and said cutter means.

4,707,705

INK JET RECORDING DEVICE

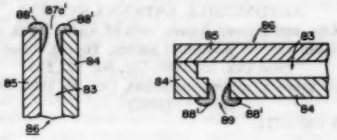
Toshitami Hara, Tokyo; Yasushi Sato, Kawasaki; Yasushi Takatori, Machida, and Yoshiaki Shirato, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 641,405, Aug. 14, 1984, abandoned, which is a continuation of Ser. No. 429,455, Sep. 30, 1982, abandoned, which is a division of Ser. No. 267,649, May 27, 1981, abandoned, which is a division of Ser. No. 87,801, Oct. 24, 1979, Pat. No. 4,296,421. This application Mar. 24, 1986, Ser. No. 844,228

Claims priority, application Japan, Oct. 26, 1978, 53-131860; Oct. 26, 1978, 53-131861; Oct. 30, 1978, 53-133376; Nov. 14, 1978, 53-140111; Nov. 14, 1978, 53-139978; Nov. 14, 1978, 53-139979; Dec. 4, 1978, 53-150377; Dec. 15, 1978, 53-156102; Dec. 20, 1978, 53-157148; Dec. 27, 1978, 53-165883

Int. Cl.[4] G01D *15/18;* **F16L** *9/14*

U.S. Cl. 346—75 **25 Claims**



1. A device for recording comprising:

means defining a liquid chamber, said liquid chamber having a discharging orifice through which a liquid recording medium in said liquid chamber is ejected, the discharging orifice including a layer of a cured resin film which regulates the size of the opening of the discharging orifice.

4,707,706

THERMAL COLOR RECORDING APPARATUS

Fumikazu Nagano, Yamatokoriyama, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Sep. 18, 1986, Ser. No. 908,723

Claims priority, application Japan, Sep. 20, 1985, 60-209091

Int. Cl.[4] G01D *15/10;* **B41J** *3/20;* **H04N** *1/46*

U.S. Cl. 346—76 PH **4 Claims**

1. In a thermal recording apparatus including a thermal head including a plurality of heating elements, and means for feeding a recording paper sheet in a direction at right angles to a recording line of said thermal head, wherein recording on the recording paper sheet is sequentially performed upon recording scanning of the recording paper sheet in a direction of the recording line by said thermal head and feed of the recording paper sheet by said means, the improvement comprising:

said heating elements each having a predetermined value of resolution in a feed direction of the recording paper sheet;

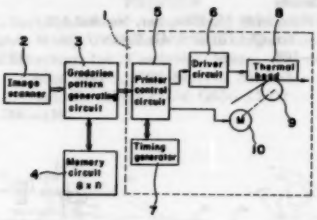
a printer control circuit including,

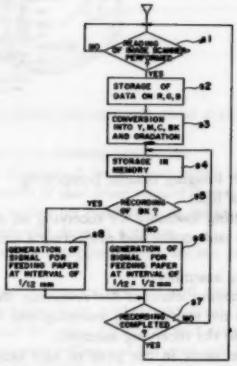
first feed control means for controlling feed of the recording paper sheet so as to feed the recording paper sheet through an interval of a half of the predetermined value at the time of recording scanning of each line of the recording paper sheet by said thermal head,

second feed control means for controlling feed of the recording paper sheet so as to feed the recording paper sheet through an interval of the predetermined value multiplied by a natural number at the time of recording scanning of each line of the recording paper sheet by said thermal head;

wherein feed of the recording paper sheet is controlled by

said first feed control means at the time of recording of hues of yellow, magenta and cyan and is controlled by




STORAGE OF DATA ON R,G,B
CONVERSION INTO Y, M, C, Bk AND GRADATION
STORAGE IN MEMORY
GENERATION OF SIGNAL FOR FEEDING PAPER AT INTERVAL OF 1/12 mm
GENERATION OF SIGNAL FOR FEEDING PAPER AT INTERVAL OF 1/12 × 1/2 mm
YES
NO

said second feed control means at the time of recording of a hue of black.

4,707,707

THERMAL-TRANSFER INK RIBBON

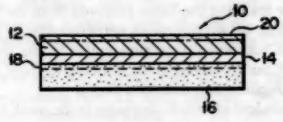
Tadayoshi Ohno, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 3, 1986, Ser. No. 847,446

Claims priority, application Japan, Apr. 9, 1985, 60-73428

Int. Cl.[4] G01D *15/16*; B41J *3/20*; B41M *3/12*

U.S. Cl. 346—76 PH **34 Claims**



1. An ink ribbon comprising:

an ink supporting member;

an intermediate layer mounted on the ink supporting member; and

ink mounted on the intermediate layer,

said ink having supercooling property and being susceptible to softening or melting by heat, and

said intermediate layer being adapted to reduce adhesion of the ink to the intermediate layer above a temperature at which the ink is softened or melted.

4,707,708

THERMAL PRINT HEAD

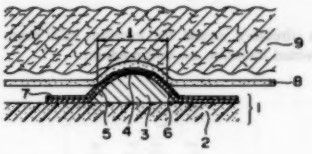
Tomoji Kitagishi; Akira Sasaki; Akiyoshi Hakoyama, all of Hitachi; Shigetaka Furukawa, Takahagi; Masafumi Suzaki; Ryooichi Kobayashi, both of Hitachi; Katsumasa Mikami, Ibaraki; Yoshihito Takahashi, Hitachi; Yousuke Nagano, Hitachi, and Takeo Honma, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 25, 1986, Ser. No. 911,323

Claims priority, application Japan, Sep. 27, 1985, 60-212475; Sep. 27, 1985, 60-212486; Oct. 4, 1985, 60-220123

Int. Cl.[4] G01D *15/10*; B41J *3/20*; H05B *1/00*

U.S. Cl. 346—76 PH **7 Claims**



1. A thermal transfer printer comprising:

a thermal head; and

a platen positioned against said thermal head through a printing sheet;

said thermal head comprising a substrate formed of heat insulating material, at least one glaze layer on a top surface of said substrate extending longitudinally thereof, a plurality of heat generating elements on said glaze layer, a plurality of electrodes each connected to said heat generating elements in a manner to form an opening for the heat generating elements and a protective layer for preventing the electrodes and heat generating elements from contacting the printing sheet to avoid their wear;

wherein the improvement resides in that:

a portion of said protective layer for protecting the heat generating elements has a height which is greater by 5 μm than the height of a portion of the protective layer for protecting the electrodes; the width of the glaze layer transversely of the substrate is less than 200 μm at a location which is 10 μm below a top surface of the portion of the protective layer for protecting the heat generating elements in a vertical direction, and the platen is a flat platen and its deflection caused to occur by a biasing force exerted on the thermal head is more than 0.02 time and less than twice as great as the height of the glaze layer.

4,707,709

IMAGE RECORDING APPARATUS IN WHICH EXPOSURE LEVELS ARE A FUNCTION OF IMAGE CONTENTS

George N. Tsilibes, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 17, 1986, Ser. No. 819,580

Int. Cl.[4] G01D *9/42*; G03G *15/00*

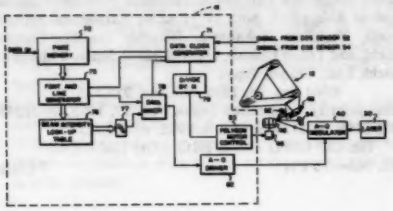
U.S. Cl. 346—108 **9 Claims**

1. Image recording apparatus for recording information from a source onto a receiving medium, said information containing a series of images and a predetermined category for each image, said apparatus comprising:

generating means coupled to said source and responsive to information therein for producing an electrical signal corresponding to said series of images;

means for modulating said electrical signal to produce a modulation signal which reflects a preselected exposure value for the category of each image in said series;

beam producing means for producing a beam of light modulated in accordance with said modulation signal; and



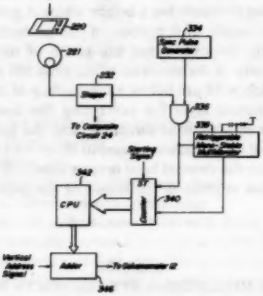
beam directing means for locating said beam of light at selected locations on said medium.

4,707,710

METHOD OF DETECTING A DRIFT AMOUNT IN TWO-DIMENSIONALLY SCANNING A FORM SLIDE FILM AND A DETECTING APPARATUS

Hidetoshi Shinada, Kanagawa, Japan, assignor to Thomson-CSF, Paris, France

Filed Nov. 26, 1985, Ser. No. 801,711
Claims priority, application Japan, Nov. 29, 1984, 59-252688
Int. Cl.[4] G01D 9/42; H04N 1/21
U.S. Cl. 346—108 **21 Claims**



1. A method of detecting a drift amount in a vertical scanning direction in two-dimensionally scanning of a form slide film of an optical information recording apparatus, comprising steps of:

two-dimensionally scanning a sensor mark formed on the form slide film within a predetermined vertical scanning period by a raster beam so as to produce pulse signals by intersecting the sensor mark;

counting the number of the pulse signals within the predetermined vertical scanning period;

processing the counted number of the pulse signals in comparison with a reference number so as to produce the drift amount; and

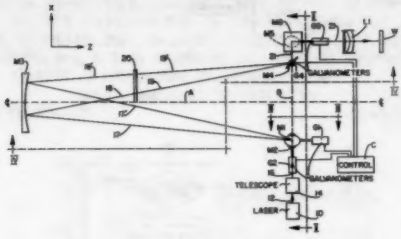
controlling a vertical scanning pitch of the raster beam based upon the drift amount.

4,707,711

CHARACTER IMAGING SYSTEM

John H. Hunter, Ottawa, Canada, assignor to Lumonics Inc., Kanata, Canada

Filed May 15, 1986, Ser. No. 863,439
Int. Cl.[4] G01D 9/42; H04N 1/04
U.S. Cl. 346—108 **12 Claims**



1. A character imaging system, comprising

(a) a source of light,

(b) a transmitting assembly for receiving an incoming light beam from said source and projecting a transmitted light beam,

(c) a receiving assembly,

(d) a first imaging element for receiving the transmitted beam from the transmitting assembly and for projecting said beam to the receiving assembly.

(e) an opaque mask in the path of said beam, said mask having an array of windows each in the shape of a character, an image of which is to be projected onto a working surface,

(f) the transmitting assembly including means for scanning the transmitted beam in two directions perpendicular to each other and both substantially perpendicular to the direction of extent of said transmitted beam whereby to cause the beam passing through the mask to pass through a selected one of said characters in said mask,

(g) the spacing of said assemblies from the first imaging element and the focal length of said first imaging element being such that said first imaging element images the transmitting assembly onto the receiving assembly regardless of which character in the mask is traversed by said beam,

(h) the receiving assembly including further scanning means synchronised with the means for scanning the transmitted beam for scanning the beam received from the first imaging element in two directions perpendicular to each other and both substantially perpendicular to the direction of extent of said received beam in order to form a working beam extending in a direction that is

(i) independent of which character in the mask is traversed by said transmitted beam, and

(ii) determined by a desired location on the working surface into which there is to be projected an image of the traversed character in the mask, and

(i) a second imaging element for receiving the working beam and projecting said working beam onto the working surface,

(j) the spacing of the mask and the working surface from the second imaging element and the focal length of the second imaging element being such as to project an image of the traversed character in the mask onto the working surface.

4,707,712

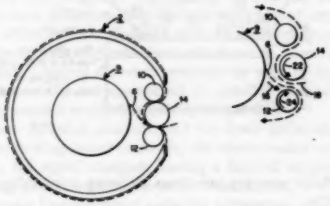
METHOD AND APPARATUS FOR TRANSPORTING AND TENSIONING SHEET MATERIALS IN AN INK JET PRINTER

Dennis J. Buckley, Nashua; Arthur Cleary, Derry, both of N.H., and Calvin Winey, Tewksbury, Mass., assignors to Advanced Color Technology, Inc., Cambridge, Mass.

Filed May 9, 1986, Ser. No. 861,263

Int. Cl.[4] G01D *15/24*; G03G *15/00*

U.S. Cl. 346—136 13 Claims



1. In an image forming device, apparatus comprising

a drum,

first drive means for rotating said drum,

sheet material positioned within said drum and extending from the interior of said drum around the outside surface,

image forming means for producing an image on said sheet material while said drum is rotating,

positioning means for stopping said drum in a predetermined position,

first and second rollers carried by said drum, said sheet material extending from within said drum between said rollers, around the outer surface of said drum and thence again between said rollers and between said second roller and said sheet material,

second drive means, and

means coupling said second drive means to said rollers when said drum is in said predetermined position having

a first operating condition driving said first and second rollers in a forward direction thereby to cause said sheet material to be withdrawn from said drum and follow a path around the exterior of said drum and thence away from said drum, and

a second operating condition locking said second roller and driving said first roller in a reverse direction thereby to tension said sheet material around the outside of said drum.

4,707,713

IMAGE RECORDING APPARATUS

Naoki Ayata, Machida; Seiji Saito, Yokosuka; Hidetoshi Suzuki; Kunitaka Ozawa, both of Tokyo, and Noboru Koumura, Narashino, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 433,969, Oct. 13, 1982, abandoned. This application Nov. 12, 1985, Ser. No. 796,536

Claims priority, application Japan, Oct. 19, 1981, 56-165617; Oct. 19, 1981, 56-165618; Oct. 19, 1981, 56-165619; Oct. 19, 1981, 56-165620

Int. Cl.[4] G01D *15/16*; G03G *15/01*

U.S. Cl. 346—140 R 25 Claims

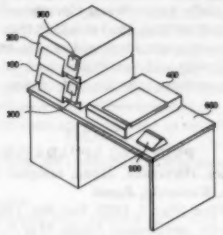
1. An image recording apparatus comprising:

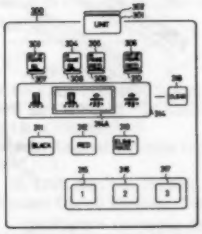
means for setting a color recording mode for a desired color image recording;

means for registering different color recording modes set from said setting means;

means for selecting one of the plurality of color recording modes registered in said registering means; and

means for recording a color image on a recording material in accordance with the color recording mode read out from





said registering means based on selection by said selecting means.

4,707,714

COVERING DEVICE FOR PROTECTING THE NOZZLE AREA OF AN INK JET WRITING HEAD

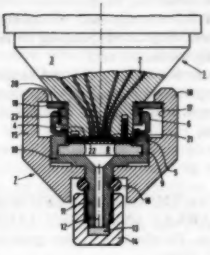
Manfred Rosenthal, and Jan Roulaux, both of Kirchen-Freusburg, Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 25, 1986, Ser. No. 878,168

Claims priority, application Fed. Rep. of Germany, Jun. 26, 1985, 3522799

Int. Cl.[4] G01D *15/18*

U.S. Cl. 346—140 R 7 Claims



1. A covering device for mounting on the end face of an ink jet writing head for protecting the nozzles and the nozzle area of said writing head, which device can be detachably connected to the ink jet writing head in a sealing manner and which forms a cavity which is open toward said nozzles when said device is connected to said writing head, said cavity serving to receive liquid ink from said nozzles, said device comprising an axially symmetrical element having a circular face with an opening into a funnel shaped space leading into a closable

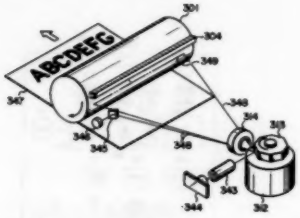
ventilation duct which can be opened to the atmosphere, said device including a seal with an aperture, said seal being located between said end face of said writing head and said circular face of said axially symmetrical element when said device is connected to said writing head at which time said aperture and said funnel shaped space form said cavity, and a screw cap on said element closing said ventilation duct, said ventilation duct comprising an outflow tube for said device.

4,707,715

PRINTING APPARATUS

Kunihiko Miura, Hiratsuka, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 7, 1985, Ser. No. 731,380
Claims priority, application Japan, May 9, 1984, 59-94792
Int. Cl.[4] G01D *15/14*; G03G *15/00*; H04N *1/21*
U.S. Cl. 346—160 **13 Claims**



1. A printing apparatus comprising:

image forming means, in accordance with an externally supplied image data, for forming an image on a given recording area of an image carrier with a center of the recording area aligning with a center of the image carrier in a width direction and one end of the recording are aligning with one end of the image carrier in a length direction, the recording area being determined by a recording area data;

transfer means for transferring the image on the image carrier onto a recording medium of a given size;

feeding means for feeding said recording medium of a given size to said transfer means with a center of the recording medium aligning with the center of the image carrier in the width direction and one end of the image carrier aligning with one end of the recording medium in a length direction, the size of the recording medium being determined by an externally supplied size data;

storing means for storing said recording area data, said recording area data corresponding to respective sizes of the recording mediums; and

controller means for reading out and supplying the recording area data stored in said storing means to said image forming means in accordance with the size of the recording medium.

4,707,716

HIGH RESOLUTION, HIGH EFFICIENCY I.R. LED PRINTING ARRAY AND FABRICATION METHOD

Joseph J. Daniele, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 667,706, Nov. 2, 1984, Pat. No. 4,639,999. This application Aug. 14, 1986, Ser. No. 895,983
Int. Cl.[4] H01L *33/00*
U.S. Cl. 357—17 **7 Claims**

1. An array of IR LEDs for printing images, comprising:

(a) a GaAs—n substrate, one surface of said substrate being metallized to provide a common electrical contact for said LEDs;

(b) a first layer of GaAlAs—n on the other surface of said substrate;

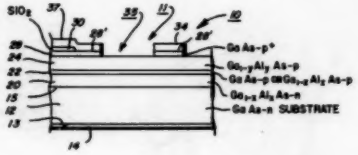
(c) a second layer of GaAs—p or GaAlAs—p on said first layer;

(d) a third layer of GaAlAs—p on said second layer;

(e) an insulating layer on said third layer,

(f) a fourth electrical contact layer of GaAs—p+ between said third layer and said insulating layer;

(g) a portion of both said insulating layer and said fourth electrical contact layer being removed at selected points to expose predetermined areas of said third layer whereby



to form viewing windows defining a plurality of said LEDs;

(h) the area of said insulating layer bordering each of said LED viewing windows being removed to expose said fourth electrical contact layer therebeneath; and

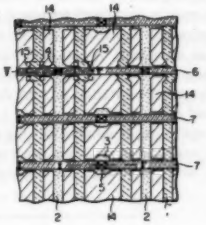
a fifth metal contact layer on said exposed areas of said fourth electrical contact layer bordering each of said viewing windows whereby to provide individual electrical contacts for each of said LEDs.

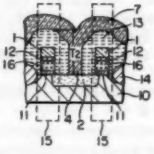
4,707,717

SEMICONDUCTOR MEMORY DEVICE

Kazuo Hirabayashi, Itami, and Makoto Yamamoto, Amagasaki, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Nov. 26, 1985, Ser. No. 801,805
Claims priority, application Japan, Dec. 5, 1984, 59-258661
Int. Cl.[4] H01L *29/78, 21/88, 29/44, 21/76*
U.S. Cl. 357—23.11 **8 Claims**





1. A semiconductor integrated circuit memory device comprising:

a semiconductor substrate carrying FET memory transistor cells disposed in columns and rows in a matrix;

a gate electrode layer carried by said substrate and providing

gate electrodes forming an address line for each column or row of memory transistor cells in the matrix;

an insulating film layer coating said gate electrode layer;

a source diffusion layer disposed relative to said gate eelctrode layer to form a source diffusion channel for each column or row of memory transistor cells;

a metallic wire layer disposed on said insulating film layer and said gate electrode layer forming lead wires extending orthogonally with respect to said gate electrodes and connected to said source diffusion channels at ohmic contact nodes formed in contact holes, thus forming connecting lead wires for transferring information between said source diffusion channels and a peripheral circuit;

a drain diffusion layer disposed relative to said source diffusion layer and said gate electrode layer to form a drain diffusion channel for each column or row of memory transistor cells and connected to metallic lead wires at ohmic contact nodes formed in contact holes;

the source diffusion channels and the drain diffusion channels providing signal channels, the ohmic nodes connecting to the signal channels having a layered structure including gate electrodes on either side thereof;

the channels forming signal paths for addressing, control, or data flow to or from a peripheral circuit via the ohmic contact nodes on the channels;

a field insulating film on said substrate dividing it into film-free source and drain diffusion channels defining the memory cell matrix and narrow film-free areas extending from certain of the ohmic contact nodes to the layered structure on either side thereof;

whereby the depth of a source contact hole filled with metal to provide a source ohmic contact node for connecting the metallic lead wires to the source diffusion channels is substantially the same as the depth of a drain contact hole filled with metal to provide a drain ohmic contact node for connecting the drain diffusion channels to the metallic lead wires.

4,707,718

READ-ONLY MEMORY

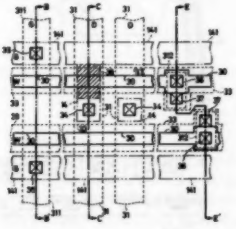
Yoshio Sakai, Hachioji; Ryo Nagai, Koganei; Shuichi Yamamoto, Kokubunji; Hideo Nakamura, Nishitama, and Kouki Noguchi, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 30, 1984, Ser. No. 635,401

Claims priority, application Japan, Jul. 29, 1983, 58-137537

Int. Cl.⁴ H01L *27/10*

U.S. Cl. 357—45 **12 Claims**



1. A read-only memory comprising a plurality of insulated gate field effect transistors, a plurality of word lines, a plurality of data lines, and a plurality of memory cells disposed at respective intersections of the word lines and the data lines, wherein:

said word lines are formed straight on a semiconductor substrate and operate as gate electrodes of said insulated gate field effect transistors formed in said memory cells;

first conductive lines are provided over said word lines through an insulator and are electrically connected to said word lines at least at two points;

first impurity regions are provided in said semiconductor substrate and operate as one of a drain or source of said insulated gate field effect transistors, said first impurity regions being formed in parallel with said word lines;

second impurity regions are provided in said semiconductor substrate and operate as the other of said source or drain of said insulated gate field effect transistors;

second conductive lines are connected to said first impurity regions; and

third conductive lines are connected to said second impurity regions;

and further wherein:

said second conductive lines operate as ground lines and are arranged so that each of said first impurity regions is coupled to one of said ground lines through a contact hole in an insulator formed over each of said first impurity region;

said third conductive lines operates as data lines; and

information is read out from said cells selected by said word lines and said data lines.

4,707,719

SEMICONDUCTOR DEVICE HAVING AN ANNULAR REGION FOR IMPROVED VOLTAGE CHARACTERISTICS

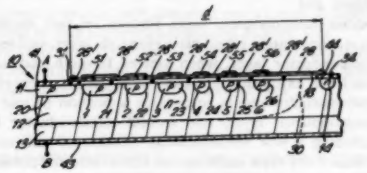
Kenneth R. Whight, Cowfold, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 21, 1985, Ser. No. 789,972

Claims priority, application United Kingdom, Nov. 21, 1984, 8429410

Int. Cl.⁴ H01L *27/02, 29/34, 29/40, 29/04*

U.S. Cl. 357—53 **6 Claims**



1. A semiconductor device comprisng a semiconductor body having a major surface and a body portion of one conductivity type adjacent said major surface of the body, an active device region of the opposite conductivity type also adjacent said major surface and forming with said body portion a main p-n junction which is operated under reverse bias in at least one mode of operation of the device, at least one annular region of said opposite conductivity type adjacent said major surface and extending around said active device region to form with said body portion an auxiliary p-n junction located within the spread of a depletion layer from the reverse-biased main p-n junction and thereby serving to increase the breakdown voltage of the main p-n junction, a passivating dielectric layer which extends over an area of said major surface between the active device region and a surrounding region of the body portion which is located beyond said at least one annular region, said dielectric layer having windows at the area of said active device region and said surrounding region, and an electrically resitive layer overlying the dielectric layer and being electrically connected to said active device region and to said surrounding region of the body portion via said windows in the dielectric layer, said resistive layer being insulated by the dielectric layer from said at least one annular region, at least one annular area which overlies said at least one annular region, the resistive layer at said at least one annular area being provided with conductive connection means which is at least about 10 times more highly conductive than the

resistance of adjacent parts of the resistive layer and which provides an electrical connection between said adjacent parts of the resistive layer.

4,707,720

SEMICONDUCTOR MEMORY DEVICE

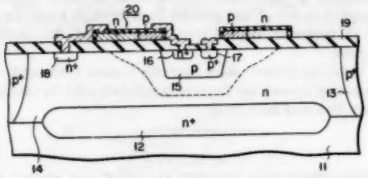
Koji Shirai, and Ken Kawamura, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 27, 1985, Ser. No. 802,372

Claims priority, application Japan, Nov. 29, 1984, 59-252319; Nov. 29, 1984, 59-252326

Int. Cl.[4] H01L *29/40, 29/78, 29/04*

U.S. Cl. 357—53 **16 Claims**



1. A semiconductor device comprising:

a first semiconductor layer of a first conductivity type:

a semiconductor region of a second conductivity type formed in said first semiconductor layer, said first semiconductor layer and said semiconductor region defining therebetween a planar junction;

an insulation layer of a predetermined pattern formed on said first semiconductor layer and said semiconductor region; and

a second semiconductor layer formed on said insulation layer, constituting a field plate electrode layer, said second semiconductor layer, when viewed through said insulation layer, extending outwardly from the periphery of said semiconductor region to overlay a portion of said first semiconductor layer, said second semiconductor layer including a first semiconductor portion of said second conductivity type and a second semiconductor portion of said first conductivity type, said first semiconductor portion being disposed adjacent to said semiconductor region, when viewed through said insulation layer, said second semiconductor protion being disposed adjacent to said first semiconductor layer, when viewed through said insulation layer, said first and second semiconductor portions defining therebetween a junction extending through the entire thickness of said second semiconductor layer, and said junction defined between said first and second semiconductor portions, when viewed through said insulation layer, overlaying said first semiconductor layer outside said semiconductor region.

4,707,721

PASSIVATED DUAL DIELECTRIC GATE SYSTEM AND METHOD FOR FABRICATING SAME

Saw T. Ang, Garland, and Patrick A. Curran, Plano, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 20, 1986, Ser. No. 831,379

Int. Cl.[4] H01L *29/78, 29/04, 29/14, 29/46*

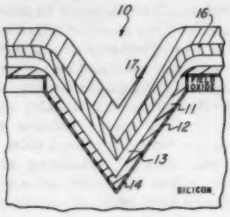
U.S. Cl. 357—54 **5 Claims**

1. A passivated dual dielectric gate system comprising:

a monocrystalline substrate having a surface;

a passivated densified silicon dioxide dielectric film at the surface of the substrate, formed to a thickness of 200–1000 Å by low pressure chemical vapor deposition (LPCVD);

an undoped layer 500 to 1000 Å thick of amorphous silicon on the silicon dioxide; and



a layer 500–1000 Å thick of titanium nitride on the amorphous silicon to passivate and protect the dual dielectric gate.

4,707,722

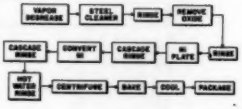
LASER MARKING METHOD AND ABLATIVE COATING FOR USE THEREIN

Lee E. Folk, Phoenix, and Reginald K. Asher, Scottsdale, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 820,052, Jan. 21, 1986, which is a division of Ser. No. 682,129, Dec. 17, 1984. This application Jan. 9, 1987, Ser. No. 4,779

Int. Cl.[4] H01L *23/06*

U.S. Cl. 357—67 **8 Claims**



1. A semiconductor device package comprising:

at least one metal surface;

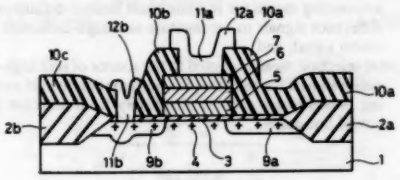
a layer of nickel coating said at least one metal surface, said layer of nickel having an upper portion converted to a radiant energy absorptive form, said upper portion defining an opening therethrough exposing a lower nonconverted portion of said layer of nickel.

4,707,723

SEMICONDUCTOR DEVICE USING A REFRACTORY METAL AS AN ELECTRODE AND INTERCONNECTION

Tatsuo Okamoto; Masahiro Shimizu, and Katsuhiro Tsukamoto, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 18, 1986, Ser. No. 830,129
Claims priority, application Japan, Mar. 8, 1985, 60-47031
Int. Cl.[4] H01L *23/54*
U.S. Cl. 357—67 9 Claims



1. A semiconductor device including a refractory metal in an electrode and interconnection of a multilayer structure formed on a semiconductor substrate, said electrode and interconnection comprising:

a low resistance metal silicide layer, and

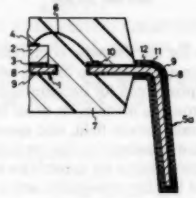
a refractory ternary alloy layer of a low resistance formed on said low resistance metal silicide layer and having corrosion resistance to chemicals containing hydrofluoric acid, said ternary alloy layer comprising a first refractory metal, a second refractory metal and silicon.

4,707,724

SEMICONDUCTOR DEVICE AND METHOD OF MANUFACTURING THEREOF

Akira Suzuki, Ohme; Hideki Tanaka, Koganei, and Gen Murakami, Machida, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 740,420, Jun. 3, 1985, abandoned. This application Jan. 2, 1987, Ser. No. 175
Claims priority, application Japan, Jun. 4, 1984, 59-112933
Int. Cl.[4] H01L *23/48*
U.S. Cl. 357—71 15 Claims



1. In a semiconductor device comprising a pellet in which is formed a semiconductor integrated circuit with semiconductor elements as main elements, a plurality of leads that are electrically connected to a plurality of bonding pads of said pellet via fine metal wires, and a resinous sealing body which seals said pellet, said fine metal wires, and portions of said plurality of leads to which said fine metal wires are connected, the improvement wherein a base member of each of said leads is a copper alloy consisting chiefly of copper, an alloy layer consisting of nickel and tin or iron is formed on the whole surface of the base member of each of said leads, a metal plated layer consisting chiefly of copper is formed on portions of the leads exposed from said resinous sealing body, and a solder layer is formed on surfaces of the metal plated layer on the leads exposed from said resinous sealing body.

4,707,725

FLUORESCENT COATING FOR UV SENSITIVE SEMICONDUCTOR DEVICE

Eizo Ito, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 26, 1986, Ser. No. 900,441
Claims priority, application Japan, Sep. 30, 1985, 60-219397
Int. Cl.[4] H01L *23/30, 23/28*
U.S. Cl. 357—72 9 Claims

1. A semiconductor device including an erasable programmable read-only memory whose storage contents are erased by ultraviolet rays supplied through an ultraviolet-irradiated surface, said semiconductor device comprising:

a semiconductor chip provided thereon with said programmable read-only memory erasable with ultraviolet rays and having said ultraviolet-irradiated surface;

an ultraviolet-ray generating layer formed on said ultraviolet-irradiated surface for generating ultraviolet rays in response to externally supplied energy rays to supply the same to said ultraviolet-irradiated surface; and

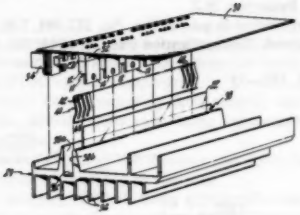
a synthetic resin layer provided to cover said semiconductor chip and said ultraviolet-ray generating layer for transmitting said externally supplied energy rays.

4,707,726

HEAT SINK MOUNTING ARRANGEMENT FOR A SEMICONDUCTOR

David V. Tinder, Dearborn, Mich., assignor to United Technologies Automotive, Inc., Dearborn, Mich.

Filed Apr. 29, 1985, Ser. No. 728,647
Int. Cl.[4] H01L *23/02;* H01B *7/34;* F28F *7/00;* H02B *1/10*
U.S. Cl. 357—81 10 Claims



1. Heat sink mounting arrangement for a semiconductor comprising:

a heat sink having an elongated channel formed therein, said channel being defined by a pair of opposed side wall surfaces of said heat sink and being open at its front;

a plurality of packaged semiconductors positioned within and disposed along said heat sink channel; and

spring means comprising a plurality of spring beams connected in common along an end in comb-like fashion

positioned in said heat sink channel and interposed between one of said pair of side wall surfaces and said semiconductors in mutually opposed compressive engagement therewith, each said spring beam being associated with only a respective single one of said semiconductors.

4,707,727

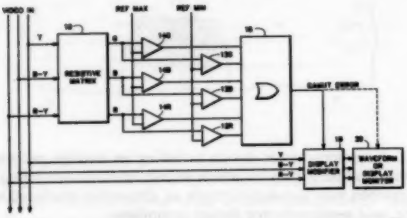
APPARATUS FOR PROVIDING AN INDICATION THAT A COLOR REPRESENTED BY A Y, R-Y, B-Y COLOR TELEVISION SIGNAL IS VALIDLY REPRODUCIBLE ON AN RGB COLOR DISPLAY DEVICE

Bruce J. Penney, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Apr. 8, 1986, Ser. No. 849,615

Int. Cl.[4] H04N *17/02, 9/67;* **G03F** *3/08*

U.S. Cl. 358—10 **6 Claims**



1. Apparatus for providing a signal that indicates whether a color represented by a video signal having a luminance component and color difference components is validly reproducible on a color display device comprising:

first means connected to receive the luminance and color difference components to provide three primary color components therefrom, and

comparison means for comparing the amplitude of each primary color component with predetermined minimum and maximum values and providing an indication if the amplitude of one or more of the primary color components is outside the range established by the corresponding predetermined minimum and maximum values.

4,707,728

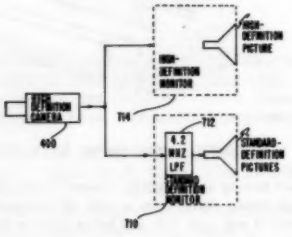
COMPATIBLE HDTV WITH INCREASED VERTICAL AND HORIZONTAL RESOLUTION

Robert N. Hurst, Cherry Hill, N.J., assignor to RCA Corporation, Princeton, N.J.

Continuation-in-part of Ser. No. 352,001, Feb. 24, 1982, abandoned. This application Dec. 28, 1984, Ser. No. 687,462

Int. Cl.[4] H04N *7/08*

U.S. Cl. 358—12 **23 Claims**



1. An arrangement for transmitting high-definition television signals comprising:

a source of high-definition line-scan signals representative of an image;

averaging means coupled to said source of high-definition signals for limiting the definition of said high-definition television signals in the line-scan direction to form limited-definition television signals:

subtracting means coupled to said averaging means and to said source of high-definition signals for comparing said high-and limited-definition signals to form a difference signal;

summing means coupled to said averaging means and to said subtracting means for summing said limited-definition and difference signals to reconstitute said high-definition television signal; and

pixel selection means coupled to the source of said high-definition signals for selecting for presentation to said averaging means pixels derived alternately from adjacent horizontal line-scans.

4,707,729

SYSTEM FOR THE LINE-WISE COMPRESSION OF BINARY DATA OF A PICTURE FIELD IN A COMPRESSION DEVICE, DECOMPRESSION DEVICE FOR USE IN SUCH A SYSTEM, AND DISPLAY DEVICE INCLUDING SUCH A DECOMPRESSION DEVICE

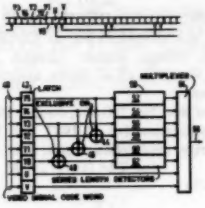
Richard Bruno, and Balthasar A. G. Van Luyt, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 14, 1986, Ser. No. 840,121

Claims priority, application Netherlands, Mar. 14, 1985, 8500735

Int. Cl.[4] H04N *11/04*

U.S. Cl. 358—13 **20 Claims**



1. A system for the line-wise compression of binary data of a picture field in a compression device, which data is organized in a matrix of pixels, and for decompressing the data, after the data passes through a medium, in order to reorganize the data so as to form said picture field, said system comprising:

a compression translator having an input for said data,

a series length detector for detecting a series length of equivalent pixel bits for conversion into a series length indication which corresponds to the series length, and

an output which is connected to said medium,

wherein the improvement comprises that:

for a colour picture which is encoded in Y-U-V bit series where a respective number of bits of successive significance levels represents the Y-bit series within a code word, at least two more-significant Y-bit series are independently applied to the series length detector, said input including a logic circuit for translating at least two Y-bits per code word into a logic combination bit, a series of logic combination bits being independently applied to the series length detector for compression,

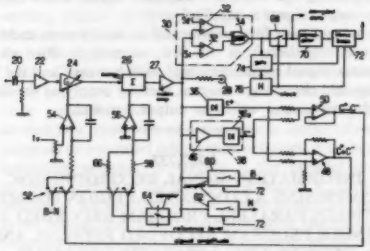
the compression translator being active only for the formation of horizontal codes, the compression translator producing per code word a total number of Y-bits and combination bits which equals the number of Y-bits within a code word.

4,707,730

SYNC EXTRACTION FOR A BROADCASTING SYSTEM WITH TIME MULTIPLEXING OF DIGITAL AND ANALOG SIGNALS

Michel Alard, Rennes, France, assignor to Etat Francais représenté par le secrétaire d'Etat Aux Postes et Télécommunications et á la Télédiffusion (Centre National d'Etudes des Telecommunications) and Etablissement Public de Diffusion dit "Telediffusion de France", both of, France

Filed May 31, 1985, Ser. No. 739,718
Claims priority, application France, Jun. 4, 1984, 84 08728
Int. Cl.[4] H04N *11/06*
U.S. Cl. 358—13 8 Claims



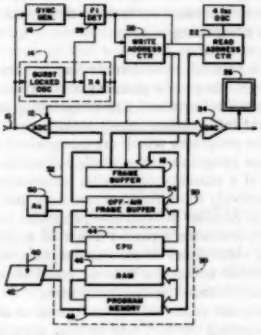
1. A synchronisation extraction process for a broadcasting system with time division multiplexing of digital signals containing a synchronisation pattern and of analog signals constituting a multiplex, signel comprising the steps of: detecting the extreme values of the multiplex signal to be subjected to decoding, previously amplified with a gain G, with a first time constant compatible with the low cut-off frequencies to be accomodated; controlling the gain G responsive to the difference between the extreme values for decreasing the gain upon increase of said difference, with a second time constant greater by several orders of magnitude than the duration of a multiplex signal cycle; adding a DC component to the amplified signal which is a decreasing function of the sum of the extreme values, until retrieval of a clock signal from said digital signals and identification of the synchronisation pattern downstream of the decoding and decoding and determining said extreme values.

4,707,731

ENCODED VIDEO TELEVISION GRAPHICS SYSTEM

John M. Ghazey, Ridgewood, N.J., assignor to Dubner Computer Systems, Inc., Paramus, N.J.

Filed Apr. 3, 1986, Ser. No. 847,975
Int. Cl.[4] H04N *9/74*
U.S. Cl. 358—22 9 Claims



1. A television graphics system for receiving an encoded analog input video signal representing a picture, and providing a video signal representing a modified form of the picture, comprising

an analog-to-digital converter for digitizing the encoded analog input video signal and generating an encoded digital signal representative of the magnitude of the encoded analog input video signal at a succession of sampling points,

a memory device,

means for writing the encoded digital signal into the memory device,

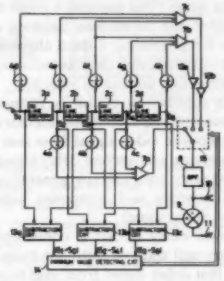
means for reading a selected portion of the encoded digital signal from the memory device, decoding the encoded digital signal so as to provide decoded digital signals representative of the magnitudes of the luminance and chrominance components of the analog input video signal, modifying at least one of the decoded digital signals, encoding the modified digital signal to generate a modified encoded digital signal representative of a modified form of the picture, and writing the modified encoded digital signal into the memory device.

4,707,732

SEPARATING CIRCUIT OF LUMINANCE AND CHROMINANCE SIGNALS FOR TV RECEIVER SELECTING BETWEEN THREE THREE LINE COMB FILTERS

Takaaki Matono; Toshinori Murata; Toshiyuki Kurita, and Isao Nakagawa, all of Yokohama, Japan, assignors to Hitschi, Ltd., Tokyo, Japan

Filed Oct. 14, 1986, Ser. No. 918,037
Claims priority, application Japan, Oct. 14, 1985, 60-226872
Int. Cl.[4] H04N *9/78*
U.S. Cl. 358—31 9 Claims



1. A circuit having comb filters for separating a luminance signal or a chrominance signal from a composite signal of TV signals in the NTSC system comprising:

(a) signal delay means including first, second, third, and fourth line memory units each being sequentially connected in series,

a delay time of each said line memory unit being identical to a horizontal scanning period, and

said first line memory unit being connected to an input terminal to which the composite signal is supplied;

(b) a first comb filter including:

a first weighting circuit connected to said input terminal for receiving the composite video signal from said input terminal and for weighting the composite video signal;

a second weighting circuit connected to said first line memory unit for receiving a first delay signal therefrom and for weighting said first delay signal;

a third weighting circuit connected to said second line memory unit for receiving a second delay signal therefrom and for weighting said second delay signal; and

a first adder circuit connected to said first, second, and third weighting circuits for adding said weighted composite signal and said weighted first and second delay signals,

said first comb filter forming a comb filter together with said first and second line memory units of said signal delay means for generating a first chrominance signal;

(c) a second comb filter comprising:

a fourth weighting circuit connected to said first line memory unit for receiving a first delay signal therefrom and for weighting said first delay signal;

a fifth weighting circuit connected to said second line memory unit for receiving a second delay signal therefrom and for weighting said second delay signal;

a sixth weighting circuit connected to said third line memory unit for receiving a third delay signal and for weighting said third delay signal; and

a second adder circuit connected to said fourth, fifth, and sixth weighting circuits for receiving the first, second, and third delay signals therefrom and for adding the weighted first, second, and third delay signals,

said second comb filter forming a comb filter together with said second and third line memory units of said delay means for generating a second chrominance signal;

(d) a third comb filter including:

a seventh weighting circuit connected to said third line memory unit for receiving a third delay signal therefrom and for weighting said third delay signal;

an eighth weighting circuit connected to said fourth line memory unit for receiving a fourth delay signal therefrom and for weighting said fourth delay signal; and

a third adder circuit connected to the seventh and eighth weighting circuits and the third weighting circuit of said first comb filter for adding the weighted second, third, and fourth delay signals,

said third comb filter forming a comb filter together with said third and fourth line memory units of said delay means for generating a third chrominance signal;

(e) a group of subtraction circuits including first, second, and third subtraction circuits in which:

said first subtraction circuit is connected to said input terminal and said second line memory unit for receiving the composite video signal from said input terminal and for receiving said second delay signal from said second line memory unit, thereby generating a first difference signal between said composite video signal and said second delay signal;

said second delay circuit is connected to said first line memory unit and said third line memory unit for receiving a first delay signal from said first line memory unit and for receiving a third delay signal from said third line memory unit, thereby generating a second difference signal between said first delay signal and said third delay signal; and

said third subtraction circuit is connected to said second and fourth line memory units for receiving a second delay signal from said second line memory unit and for receiving a fourth delay signal from said fourth line memory unit, thereby generating a third difference signal between said second delay signal and said fourth delay signal;

(f) a minimum value detecting circuit connected to the first, second, and third subtraction circuits of said subtraction circuit group for receiving the first, second, and third difference signals from said first, second, and third subtraction circuits, respectively, said minimum value detecting circuit generating a first output signal when the value of the first difference signal is less than the values of the third and second difference signals, generating a second output signal when the value of the second difference signal is less than the values of the first and third difference signals, and generating a third output signal when the value of the third difference signal is less than the values of the first and second difference signals;

(g) switch means connected to said first, second, and third comb filters for receiving the first, second and third chrominance signals therefrom, said switch means being further connected to said minimum value detecting circuit for receiving said first, second, and third output signals therefrom,

said switch means selecting and outputting the first chrominance signal when the first output signal is supplied from said minimum value detecting circuit, selecting and outputting the second chrominance signal when the second output signal is supplied, and selecting and outputting the third chrominance signal when the third output signal is supplied; and

(h) a band-pass filter connected to said switch means for receiving therefrom the first, second, or third chrominance signal selected by said switch means and for filtering said chrominance signal, thereby supplying the filtered chrominance signal to an output terminal.

4,707,733

INFORMATION SIGNAL RECORDING DISC COMPRISING A CONNECTED REGION FORMED BETWEEN PARALLEL PROGRAM RECORDED AND SINGLE PROGRAM RECORDED REGIONS, AND REPRODUCING APPARATUS THEREFOR

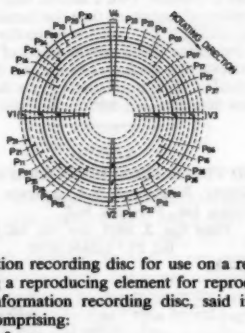
Tatsuya Shinyagaito; Terumasa Kuramoto, both of Iwai; Toyotaka Machida; Kikuji Saito, both of Kashiwa; Shunichi Shichijo, Sagamihara; Tooru Yamagishi, Tokyo; Kazuyoshi Ishii, Sagamihara; Yoshinao Kobayashi, Machida, and Atsumi Hirata, Fujisawa, all of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Mar. 25, 1985, Ser. No. 715,499

Claims priority, application Japan, Mar. 26, 1984, 59-58642

Int. Cl.[4] H04N *5/76*

U.S. Cl. 358—342 **5 Claims**



1. An information recording disc for use on a reproducing apparatus having a reproducing element for reproducing signals from the information recording disc, said information recording disc comprising:

a recording surface;

a spiral track formed on said recording surface, said spiral track being made up of a plurality of track turns and being recorded with information signals including at least video signals, said information signals making up a plurality of information programs which are categorized into parallel information programs and a single information program, only one of a plurality of parallel information programs being selectively reproduced at one time, portions of said plurality of parallel information programs being sequentially recorded with a period equal to a predetermined number of video fields of the video signals, said predetermined number being less than or equal to a number of video fields recorded in one track turn;

a parallel program recorded region formed in at least a part of said recording surface, said parallel program recorded region comprising within a predetermined sector on said recording surface a plurality of adjacent track turns re-

corded with information signals of the same video field number and making up said plurality of parallel information programs;

a single program recorded region formed in a part of said recording surface and recorded with a single information program which is to be reproduced after one of said plurality of parallel information programs in said parallel program recorded region is reproduced; and

a connecting region formed in a part of said recording surface between said parallel program recorded region and said single program recorded region for smoothly guiding said reproducing element from said parallel program recorded region to said single program recorded region,

each of said parallel program recorded region and said connecting region comprising track turns having vertical blanking parts recorded with vertical blanking periods of the video signals,

at least of said vertical blanking parts in each track turn being recorded with an address signal comprising a first code indicating whether an information program recorded in a track turn of a region is a single information program or a parallel information program, a second code indicating whether the region is the parallel program recorded region or the connecting region, a fourth code indicating the number of information programs recorded in the region, and a fifth code indicating the information program number of the information program recorded in the region.

4,707,734

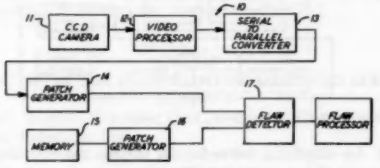
COARSE FLAW DETECTOR FOR PRINTED CIRCUIT BOARD INSPECTION

Richard L. Labinger, Trumbull; Natale F. Tinnerino, Redding, both of Conn., and Timothy E. Bryant, Yorba Linda, Calif., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Jun. 17, 1985, Ser. No. 745,967

Int. Cl.⁴ H04N *7/18*

U.S. Cl. 358—106 **13 Claims**



1. In a system for processing image data on a surface;

scanning means for scanning the surface across its length at a plurality of arbitrarily selected scan lines each one of which comprises a plurality of picture elements;

said scanning means providing as an output a serial stream of bits for each of said scan lines each bit representative of one of said picture elements in a scan line;

means for formulating said serial streams of bits into binary numbers each representative of the reflectance value of a patch of contiguous picture elements composed of n×n picture elements each.

4,707,735

SURVEILLANCE SYSTEMS

Peter W. Busby, Stevenage, England, assignor to British Aerospace Public Limited Co., London, England

Filed Dec. 10, 1985, Ser. No. 807,486

Claims priority, application United Kingdom, Dec. 10, 1984, 8431082

Int. Cl.⁴ H04N *7/18*

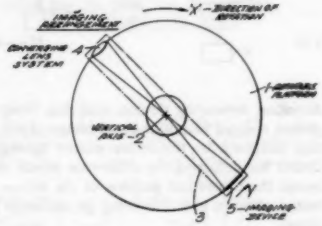
U.S. Cl. 358—108 **9 Claims**

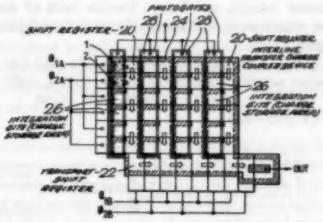
1. A passive surveillance system for detecting and for providing an identifiable image of a moving object with respect to the background including:

imaging means;

scanning means to effect scanning of the imaging means about a given axis;

the imaging means including a charge-coupled device having a photosensitive portion for receiving the image of a viewed scene, the photosensitive portion having a plurality of lines comprising individual photosensitive elements which hold induced charge in response to that part of the image falling on them, and a transport register for sequentially receiving the line charges and providing corresponding video output signals, the lines being parallel to the axis of scan;





means for deriving electrical signals representing the rate of relative movement between the image and the charge-coupled device from the rate of rotation of the scanning means and an anticipated range of speeds of an object to be detected; and

timing control means for controlling the transfer of line charges into the transport register in accordance with said derived electrical signals such that said video output signals are provided in which the image of a moving object is held substantially stationary with respect to imaging sites of the said charge-coupled device, thereby producing a generally sharp image of said moving object compared with the background.

4,707,736

SELF ALIGNMENT DEVICE FOR AN OPTICAL INFRARED IMAGE OBSERVATION SYSTEM

Dufresne de Virel, Paris, France, assignor to Thomson CSF, Paris, France

Filed Aug. 18, 1986, Ser. No. 897,352

Claims priority, application France, Aug. 20, 1985, 85 12531

Int. Cl.⁴ H04N *5/33, 7/18*

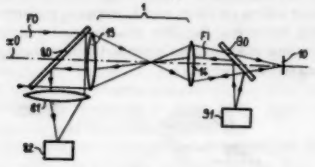
U.S. Cl. 358—113 **8 Claims**

1. A self-alignment device for an optical infrared image observation system comprising:

an optical input focussing system receiving an infrared object beam and focussing in exchange an image beam in an image plane;

an infrared cooled system for reading said image plane at a given temperature for detecting the infrared radiation, receiving said image beam detecting the optical intensity received and delivering in exchange a reading signal, and further including

a return mirror situated in said field aperture of the optical input focussing systems, in a fixed and orientated position so as to send back to the reading system its own image;



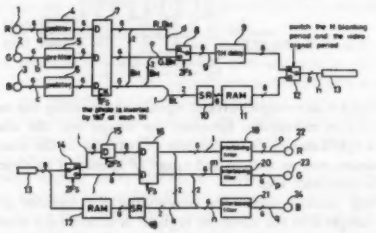
a deviation measuring device receiving from the reading system a signal identifying said image of the reading system sent back by the return mirror having a detection circuit for detecting the difference which may exist between the theoretical position of the mirror and the detected position and delivering in exchange a difference signal.

4,707,737

BAND COMPRESSION APPARATUS FOR A VIDEO SIGNAL

Mitsunori Adachi, and Satoru Tomita, both of Amagasaki, Japan, assignors to Mitsubishi Kenki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 9, 1986, Ser. No. 883,539
Claims priority, application Japan, Jul. 9, 1985, 60-151990
Int. Cl.[4] H04N 7/12, 11/06
U.S. Cl. 358—133 **4 Claims**



1. A band compression apparatus for transmitting a video signal comprising three color component signals sampled at a sampling frequency of 2Fs and a gradation of N bits per picture element, through a transmission path of a gradation of N bits per sample and a sample transmission frequency of 2Fs comprising:

a prefilter for restricting the band of each color component signal;

sub-sampling means for compressing the respective band restricted color component signal to a sampling frequency Fs;

signal separation means for separating data of 3n bits comprising the upper n bits of the sub-sampled color component signals

$$3n=2N+k\ (k<N)$$

into two main signals as transmission samples of N bits and a fraction signal of k bits;

fraction signal storage means for storing one line video signal portions of said fraction signal; and

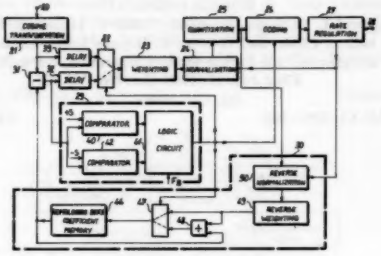
signal outputting means for outputting said stored fraction signal to the transmission path by time compressing said fraction signal into a signal of N bits as a first transmission sample during a horizontal blanking period of the video signal, or outputting said sub-sampled signal of N bits as a second transmission sample during the video signal period of the video signal.

4,707,738

ADAPTIVE PROCESS FOR THE CODING AND DECODING OF A SEQUENCE OF PICTURES BY TRANSFORMATION AND DEVICES FOR PERFORMING THIS PROCESS

Alain Ferre, Cresson Sevigne, and Yannick Villalon, Rennes, both of France, assignors to Thomson Grand Public, Paris, France

Filed Dec. 23, 1985, Ser. No. 812,326
Claims priority, application France, Dec. 21, 1984, 84 19646
Int. Cl.[4] H04N 7/12
U.S. Cl. 358—135 **7 Claims**



1. An adaptive process for the coding and decoding of a sequence of images by transformation, wherein each image is represented by a matrix of digital points, comprising the steps of:

subdividing each image into blocks of points;

applying a bidirectional transformation to each block of points to obtain a matrix of values representing transformation coefficients of the block;

determining whether each block represents a highly or slightly animated scene;

transmitting the transformation coefficients of the block, if the block represents a highly animated scene;

transmitting the differences between the transformation coefficients of the block and homologous coefficients of the homologous block in the preceding image, if the block represents a slightly animated scene;

for each block representing a highly animated scene, applying to the transformation coefficients of the block a transformation which is the inverse of the transformation applied for coding;

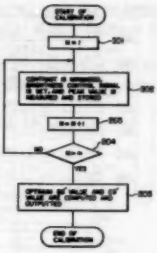
for each block representing a slightly animated scene, adding the transmitted difference coefficients of the block to homologous coefficients of the homologous block in the preceding image, and then applying the inverse transformation to the sums.

4,707,739

AUTOMATIC CALIBRATION CIRCUIT FOR MONITORING DEVICE

Azuchi Endo, and Taizo Akimoto, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 28, 1986, Ser. No. 823,426
Claims priority, application Japan, Jan. 29, 1985, 60-13448
Int. Cl.[4] H04N *17/00*
U.S. Cl. 358—139 7 Claims



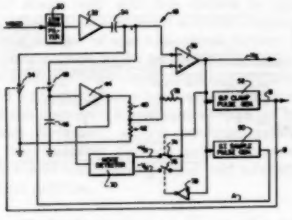
1. An automatic calibration circuit for a monitoring device in which a static image is displayed on a CRT and projected and recorded on a recording medium, the apparatus including an image amplifier circuit for amplifying an image signal to be applied to said CRT in accordance with a brightness control signal and a contrast control signal, wherein the improvement comprises: means for setting said contrast control signal to a minimum value and simultaneously setting said brightness control signal to a reference level; means for measuring the brightness of light at any position on the face of said CRT while said contrast control signal is at said minimum value and said brightness control signal is at said reference level; and means for correcting at least one of said brightness control signal and said contrast control signal in accordance with the brightness value thereby measured so as to maintain a predetermined image brightness and contrast on said CRT.

4,707,740

SYNC DETECTOR HAVING NOISE ADJUSTED SLICE LEVEL

Boyd L. Stratton, Woodside, Calif., assignor to Harris Corporation, Melbourne, Fla.

Filed Apr. 11, 1986, Ser. No. 850,811
Int. Cl.[4] H04N *5/08*
U.S. Cl. 358—153 10 Claims



1. Sync separator circuit for receiving a video signal and providing a sync signal recovered therefrom wherein said video signal includes predetermined nonpicture portions containing sync signal information and comprising:

noise detector means responsive to said video signal during said non picture portions thereof for providing a noise signal having a magnitude representative of the average noise level on said nonpicture portions thereof;

sync slicer means for comparing said video signal with a slice level signal and providing said sync signal in dependence upon said comparison;

means for providing said slice level signal; and

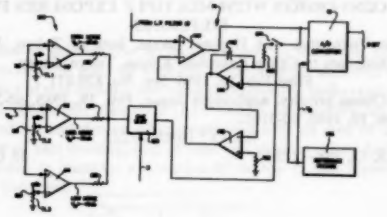
means responsive to said noise signal for varying the magnitude of said slice level signal as a function of noise on said predetermined nonpicture portions of said video signal.

4,707,741

VIDEO SIGNAL CLAMPING WITH CLAMP PULSE WIDTH VARIATION WITH NOISE

Boyd L. Stratton, Woodside, Calif., assignor to Harris Corporation, Melbourne, Fla.

Filed Apr. 11, 1986, Ser. No. 850,955
Int. Cl.[4] H04N *5/18, 5/213*
U.S. Cl. 358—171 15 Claims



1. A video signal clamping apparatus for periodically clamping a predetermined nonpicture portion of a video signal having a picture portion and said predetermined nonpicture portion to a desired reference level with the clamping time duration varying as a function of noise on said video signal, comprising:

noise detector means responsive to said video signal during said predetermined nonpicture portion of said video signal for providing a noise level signal having a value representative of the average noise level on said video signal;

clamping circuit means including actuatable switching means, having an on condition and an off condition, for, when on, completing a clamping circuit for clamping said video signal to said desired reference level; and

clamp pulse timing means responsive to said noise level signal for providing a switch turn on signal for actuating said switch to its on condition for a time duration as a function of the value of said noise level signal.

4,707,742

VIDEO SIGNAL PROCESSING ARRANGEMENT

Anthony J. Field; Atma Heerah, and Thomas C. Mackereth, all of Cambridge, England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 17, 1985, Ser. No. 724,848
Claims priority, application United Kingdom, Apr. 26, 1984, 8410704; Apr. 26, 1984, 8410706; Apr. 26, 1984, 8410709; Jul. 9, 1984, 8417439
Int. Cl.[4] H04N *5/272, 5/262*
U.S. Cl. 358—183 3 Claims

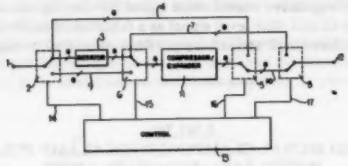
1. A video signal processing arrangement for processing television signals encoded in digital form comprising:

compressor/expander for compressing and/or expanding a television picture represented by the video signal;

rotator for rotating said television picture, said rotator being separate from said compressor/expander; and

rotator switching means for switching said rotator between

a position prior to or subsequent to said compressor/expander in said video processing arrangement, and for



maintaining a by-pass path around said rotator for a period equal to a signal delay introduced by said rotator.

4,707,743

METHOD AND APPARATUS FOR IMAGE CONVERSION WITH MULTIPLE EXPOSURES FOR FILTERING

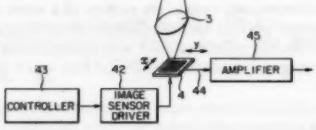
Jun Tokumitsu, and Hajime Sakata, both of Tokyo, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 13, 1986, Ser. No. 829,071

Claims priority, application Japan, Feb. 19, 1985, 60-31041; Feb. 19, 1985, 60-31042

Int. Cl.[4] H04N *5/225*

U.S. Cl. 358—213.13 **15 Claims**



1. A method of converting an input image into electrical signals which correspond to an output image subjected to a filtering process, comprising the steps of:

exposing the input image to a solid state image sensor;

transferring charges formed in said exposing step and distributed in correspondence with the input image, by a predetermined number of pixels;

re-exposing the same input image as in said exposing step to the solid state image sensor after said transferring step to add the charges generated in said two exposing steps in the solid state image sensor per each pixel with the first-generated charges having been shifted by the predetermined number of pixels, relative to the second-generated charges; and

extracting the added charges to obtain electrical signals corresponding to the output image, having the same resolution as the solid state image sensor.

4,707,744

SOLID-STATE IMAGE SENSOR

Masafumi Kimata; Masao Yamawaki, and Satoshi Yamakawa, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 7, 1986, Ser. No. 894,022

Claims priority, application Japan, Aug. 13, 1985, 60-179648

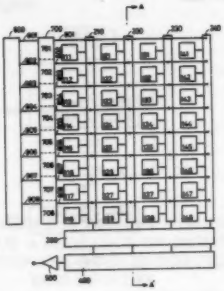
Int. Cl.[4] H04N *3/14*

U.S. Cl. 358—213.26 **3 Claims**

1. A solid-state image sensor, comprising:

pixels arranged in first and second directions orthogonal to each other and including light signal detection means **(111–148)** for detecting light signals, respectively, and charge transfer means **(210–240)** for transferring in said first direction signal charges read out from said light signal detection means,

readout command means **(600)** for sequentially selecting a pixel row from a plurality of pixel rows arranged in said second direction to provide a readout command for read-out of the signal charges, and



signal supplying means **(700)** for supplying readout signals to the pixel row which has been commanded by said readout command means so that the signal charges may be read out from said light signal detections means a plurality of times within a horizontal scanning interval, and for supplying transfer signals to the pixel rows which have not been commanded by said readout command means so that the signal charges may be transferred by said charge transfer means **(210–240)**.

4,707,745

DIGITAL COPIER WITH DOCUMENT IMAGE REGION DECISION DEVICE

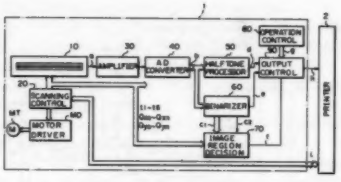
Yukio Sakano, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Dec. 20, 1985, Ser. No. 811,701

Claims priority, application Japan, Dec. 20, 1984, 59-269507; Dec. 20, 1984, 59-269505; Dec. 20, 1984, 59-269506; Dec. 20, 1984, 59-269504; Oct. 31, 1985, 60-245029; Oct. 31, 1985, 60-245030; Oct. 31, 1985, 60-245031; Oct. 31, 1985, 60-245032; Oct. 31, 1985, 60-245033; Oct. 31, 1985, 60-245034; Oct. 31, 1985, 60-245035; Oct. 31, 1985, 60-245036

Int. Cl.[4] H04N *1/40*

U.S. Cl. 358—283 **48 Claims**



1. A device for deciding a particular kind of image region to which a pixel of a document image to be processed belongs, comprising:

binarizer means for binarizing multi-level quantized digital image information associated with the document image using a second threshold level which is different from a first threshold level used for binarization of two-level image areas;

shift means for shifting the data binarized by using the second threshold level by a predetermined number of pixels

in at least one of a main scanning and a subscanning directions in which a document is scanned;

AND means for providing an AND function of the shifted data and the binarized data; and

decision means for deciding responsive to the AND function a particular image region to which a pixel of a document image to be processed belongs.

4,707,746

PROJECTION TELEVISION RECEIVER WITH A RETRACTABLE REFLECTOR

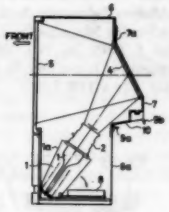
Shunji Nishikawa, Osaka, Japan, assignor to Nec Home Electronics Ltd., Osaka, Japan

Filed Aug. 25, 1986, Ser. No. 899,580

Claims priority, application Japan, Aug. 31, 1985, 60-133693[U]

Int. Cl.⁴ H04N *5/74*

U.S. Cl. 358—231 **9 Claims**



1. A video signal projection device, comprising:

a projection tube (1) for projecting an image contained in a video signal;

a screen (5) having a first surface onto which said image is projected and a second surface facing in a direction opposite to said first surface for visibly displaying said image for a viewer to observe;

a reflector (4) for reflecting said projected image onto said first surface of said screen;

a generally rectangular cabinet (6) for containing said projection tube, said cabinet having a first longitudinal side for supporting said screen and a second longitudinal side in which an opening is provided, said second longitudinal side being opposite to said first longitudinal side and being spaced a predetermined distance from said first side;

a sub-cabinet (7,10) mounted to said cabinet and disposed in said opening in said second longitudinal side for supporting said reflector, said sub-cabinet being movable between a first mounted position and a second mounted position, said second position disposing said reflector to reflect said projected image onto said first surface of said screen, wherein a first distance between said first longitudinal side and a distal portion of said sub-cabinet farthest from said first longitudinal side when said sub-cabinet is in said first position is substantially equal to said predetermined distance and a second distance between said first longitudinal side and the distal portion of said sub-cabinet when said sub-cabinet is in said second position is substantially greater than said first distance, said sub-cabinet having means to cover said opening when said sub-cabinet is in said second position.

4,707,747

HAND HELD SCANNING INPUT DEVICE AND SYSTEM

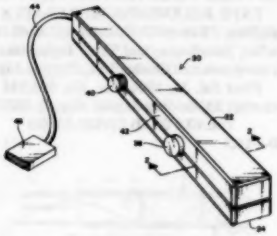
Marshall A. Rockwell, III, 303 Grenola St., Pacific Palisades, Calif. 90272

Filed Jul. 13, 1984, Ser. No. 630,884

Int. Cl.⁴ H04N *1/024*

U.S. Cl. 358—294 **31 Claims**

1. A hand held scanning device for text and graphics, which comprises a housing, a line opening in said housing, a planar substrate in said housing opposite said line opening, a linear array of photosensitive elements behind and in proximity to said opening, a line light source parallel to and spaced from said photosensitive element array, said light source being positioned to direct light through said line opening at a sheet having information to be scanned by said device, both said linear array and said line light source being mounted on said planar



substrate in side-by-side relationship, and at least one high friction resilient material rotatable guide member mounted on a surface of said housing and being configured to make contact with a substantial area on a sheet having information to be scanned by said device when compared with an area of the surface of said housing, said at least one guide member being positioned to maintain a direction of motion of said housing along the sheet.

4,707,748

IMAGE RECORDING APPARATUS

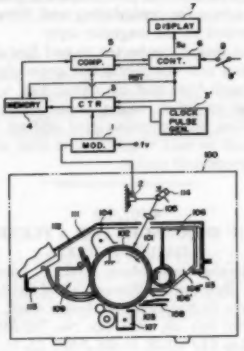
Yasumasa Ohtsuka, and Masaharu Ohkubo, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 12, 1986, Ser. No. 828,871

Claims priority, application Japan, Feb. 14, 1985, 60-027053; Feb. 14, 1985, 60-027054

Int. Cl.⁴ G03G *15/08*; H04N *1/21*

U.S. Cl. 358—298 **14 Claims**



1. An image recording apparatus, comprising:

supporting means for detachably supporting a disposable part adapted to be used for recording an image;

means for generating a beam which is modulated in accordance with a signal of said image to be recorded, a photosensitive member being exposed to the beam generated by said generating and modulating means;

time signal generating means for generating a time signal;

means for integrating the time signal produced by said time signal generating means in accordance with the duration of the signal of the image to be recorded; and

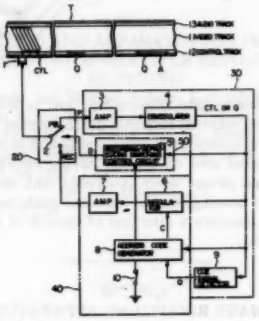
replacement signal generating means for generating a predetermined signal for calling an operator's attention to the need for replacement of said disposable part of said apparatus on the basis of the integration by said integration means.

4,707,749

ADDRESS CODE INSERTING SYSTEM FOR VIDEO TAPE RECORDING APPARATUS

Hideo Nishijima; Kaneyuki Okamoto, both of Katsuta; Takayasu Ito, Yokohama, and Shuji Toyoshima, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 31, 1986, Ser. No. 890,924
Claims priority, application Japan, Aug. 7, 1985, 60-172331
Int. Cl.[4] G11B *27/02, 15/06*
U.S. Cl. 360—14.3 3 Claims



1. A control signal recording apparatus of a magnetic recording/reproducing apparatus comprising:

means for generating a cue signal consisting of a pulse signal for searching a tape;

means for recording the cue signal from said cue signal generating means onto a control track of a magnetic tape;

first circuit means for reproducing and detecting the cue signal recorded on the magnetic tape;

second circuit means, connected to said first circuit means, for receiving said cue signal and generating an address signal different from said cue signal; and

address signal recording means, connected to said second circuit means, for recording said address signal in the control track on said magnetic tape after said cue signal for a predetermined period.

4,707,750

AUTOMATIC SEQUENCER FOR A FLEXIBLE DISK LOADER/COPIER

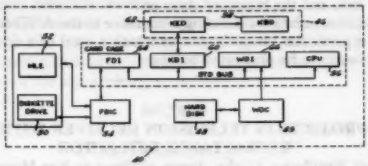
Wayne H. Anderson, Costa Mesa; David E. Larson, Anaheim, and Mark R. Reinhart, Bellflower, all of Calif., assignors to Media Systems Technology, Inc., Irvine, Calif.

Filed Feb. 20, 1985, Ser. No. 703,345
Int. Cl.[4] G11B *15/04, 5/06, 15/18*
U.S. Cl. 360—60 14 Claims

1. An apparatus for automatically transferring data to and from a plurality of flexible computer disks, comprising:

a disk drive for transferring data to and from a flexible disk in said disk drive, said disk drive including a sensor for detecting the presence of an indicator on said flexible disk, and generating an indicator signal responsive to the presence of said indicator; and

a selectable format disk controller operatively connected to said disk drive, said controller also operatively connected to a data storage device, said controller responsive to the presence of said indicator signal from said disk drive to transfer format, data, and control information from said flexible disk in said disk drive to said data storage device, and responsive to the absence of said indicator signal to



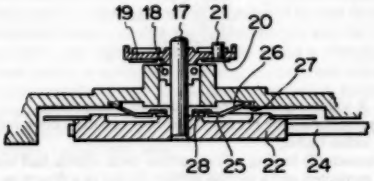
transfer format and data from said data storage device to said disk in said flexible disk drive.

4,707,751

SUPPORTING DEVICE OF A SHAFT DRIVE OF A MAGNETIC RECORD AND REPRODUCTION DEVICE

Yoshiaki Ozaki, and Mahito Takanashi, both of Tokyo, Japan, assignors to Janome Sewing Machine Co. Ltd., Tokyo, Japan

Filed Mar. 5, 1985, Ser. No. 708,340
Claims priority, application Japan, Jul. 9, 1984, 58-102550
Int. Cl.[4] G11B *5/012*
U.S. Cl. 360—97 3 Claims



1. A supporting device for supporting a drive for rotating a disc contained in a disk cassette inserted in a cassette holder of a magnetic recording and reproduction device, on a base of the recording and reproduction device wherein said drive includes a motor-driven spindle vertically extending through the base for rotation relative to the base and having a hub secured to an upper end of said spindle at an upper side of said base and a pulley secured to a lower end of the spindle at an underside of the base and rotated by a motor; the supporting device comprising bearing means fitted in said base and rotatably supporting said spindle, said pulley being spaced from the underside of said base to form a space therebetween; and a curved plate surrounding said spindle and positioned in said space, said curve plate being formed of elastic material and having radially outwardly extended portions; said base being formed with a concave recess on the underside thereof around said spindle, said radially extended portions of the curved plate engaging said concave recess so that said curved plate normally presses down said pulley to thereby press said hub against the upper side of the base and prevent the spindle against axial movement relative to the base.

4,707,752

SPACER MEANS ON FLOPPY DISKS AND ASSOCIATED TECHNIQUES

Ko K. Gyi, Thousand Oaks, Calif., assignor to Unisys Corp., Detroit, Mich.

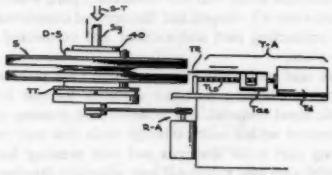
Filed Dec. 2, 1982, Ser. No. 446,276
Int. Cl.[4] G11B *5/016, 23/02*
U.S. Cl. 360—99 5 Claims

1. In a method for providing for the selective pneumatic partitioning of a stack of co-rotatable flexible recording disks, this method including:

stacking said flexible disks together with intermediate radial-

ly-venting spacer means so as to form a disk pack, with the inner periphery of the disks retained together so as to define a center-bore, and the pack being adapted to engage high speed rotation means and also being arranged to be pneumatically parted between any selected pair of adjacent disks;

introducing axially-translatable pneumatic partition-jet means into said bore; and



partitioning said pack by rotating it sufficient to induce a prescribed pumping between said disks, and positioning said jet means so as to direct one or more jet streams radially out through the spacer means defining the separation site; the improvement therewith of:

forming each said spacer means by adhering a spacer disk, including an annular peripheral array of identical separate spacer fingers on each disk adjacent disk center and thereafter removing all spacer disk portions except the fingers.

4,707,753

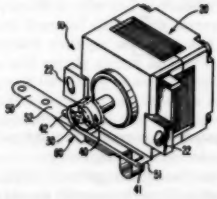
DISK DRIVE HEAD ACCESS MECHANISM

William J. Friehauf, Thornton; Donovan M. Janssen; Alan J. Kirton, both of Boulder; Michael E. Nard, Longmont, and Leroy Rose, Boulder, all of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 9, 1985, Ser. No. 807,044

Int. Cl.[4] G11B *5/55*

U.S. Cl. 360—106 **14 Claims**



1. A unitary disk drive head access mechanism mountable on a disk drive frame comprising:

a rotary output motor having a shaft;

a cylindrical pulley mounted to the shaft of said motor;

a flexible band wrapping around said cylindrical pulley and having a mid portion securely attached to said cylindrical pulley, and having a first and second portion leaving contact with the surface of the cylindrical pulley in opposite directions;

an elongated low mass tensioner having a first end portion securely attached to said first portion of said flexible band, a second end portion securely attached to said second portion of said flexible band, and an intermediate portion between said first and second end portions, said tensioner engaging said flexible band to cause the disk drive head access mechanism to be self supporting, said tensioner and said flexible band effectuated to move linearly by rotation of said shaft of said motor;

means for effectuating a force between said first and second end portions of said tensioner thereby tensioning said flexible band; and

means for attaching said second end portion of said tensioner to said head carriage.

4,707,754

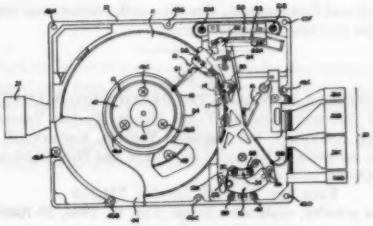
VOICE COIL BALANCED ACTUATOR

Shailesh Patel, San Jose, and Wolfgang Dirks, Monte Sereno, both of Calif., assignors to Apple Computer, Inc., Cupertino, Calif.

Filed Aug. 7, 1985, Ser. No. 763,901

Int. Cl.[4] G11B *5/55, 5/012*

U.S. Cl. 360—106 **13 Claims**



1. An actuator motor for positioning and conterbalancing a pivotally mounted arm assembly comprising:

a base;

a coil having spiral windings and a central opening passing through said spiral windings, wherein said coil is mounted on said base;

a core disposed to pass freely through said central opening and to move in a back and forth motion; said core coupled to said arm assembly and providing a magnetic flux path; wherein when current is passed through said coil inducing an electromagnetic field, said arm assembly is caused to move in accordance with said back and forth motion of said core;

a ferrous member coupled to said core and disposed to complete said magnetic flux path;

a plurality of magnets mounted on said ferrous member, wherein said ferrous member and said magnets provide said counterbalancing of said arm assembly.

4,707,755

OPTICAL READ-OUT MAGNETIC HEAD

Norio Ohta, Sayama; Shigenori Okamine, Kokubunji; Yutaka Sugita, Tokorozawa; Yosuke Seo, Sagamihara, and Takashi Tamura, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 26, 1986, Ser. No. 832,884

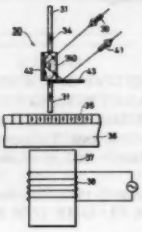
Claims priority, application Japan, Mar. 20, 1985, 60-54441; Mar. 20, 1985, 60-54440

Int. Cl.[4] G11B *11/10*

U.S. Cl. 360—114 **7 Claims**

1. An optical read-out magnetic head of a single pole type, comprising a main pole, an auxiliary pole and a writing coil, said main pole including a first magnetic thin film having high permeability and a second magnetic thin film having magneto-optical effects, and second magnetic thin film being arranged for being magnetized by a leakage magnetic field from a magnetic recording medium which is disposed proximate to said main pole and extends in a direction perpendicular to said main

pole, and said second magnetic thin film having an easy magnetization axis extending parallel to or in the plane of the film



surface of said first magnetic thin film, and, further, said magnetic head enabling magnetic writing.

4,707,756

PERPENDICULAR MAGNETIC RECORDING MEDIUM

Masaaki Futamoto, Tsukui; Yukio Honda, Fuchu; Yasutaro Uesaka, Kokubunji, and Kazuetsu Yoshida, Kodaira, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Maxell Ltd., Osaka, both of, Japan

Filed Apr. 10, 1985, Ser. No. 721,715

Claims priority, application Japan, Apr. 11, 1984, 59-70888

Int. Cl.[4] G11B *15/00*

U.S. Cl. 360—131 **19 Claims**

1. A perpendicular magnetic recording medium comprising a substrate, an underlayer which is made of a material containing as its principal ingredient at least one element selected from the group consisting of Si and Ge and which is deposited on said substrate, and a perpendicular magnetic film which is made of a Co-based alloy and which is deposited on said underlayer.

4,707,757

PRESSING SPRING FOR A MAGNETIC TAPE CARTRIDGE

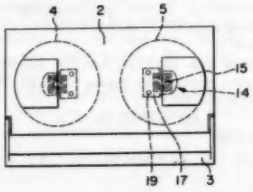
Haruo Shiba, and Yoshiya Sakata, both of Saku, Japan, assignors to TDK Corporation, Tokyo, Japan

Filed Aug. 27, 1984, Ser. No. 644,256

Claims priority, application Japan, Sep. 9, 1983, 58-139112[U]

Int. Cl.[4] G11B *23/02, 15/32;* **G01B** *1/04*

U.S. Cl. 360—132 **5 Claims**



1. In a magnetic tape cartridge having lower and upper half casings between which at least one reel is positioned for rotation, said reel having a projection at an axis of said rotation, a pressing spring for each said reel, each said pressing spring comprising:

a reel contacting part engageable with said projection to provide a pressing force thereon;

a base plate surrounding said reel contacting part and being fixed relative to one of said half casings; and

a spring functioning part connecting said reel contacting part and said base plate, wherein said spring-functioning part is in a form of a plurality of arms connecting said reel-contacting part to said base plate, said arms being symmetrical about said reel-contacting part, wherein each of said arms is L-shaped and has one end connected to said reel contacting part and another end connected to said base plate;

wherein said reel contacting part, said base plate and said spring functioning part are unitarily formed from flat elastic sheet material, and wherein said pressing spring is positioned within said cartridge such that said reel contacting part is on said axis and said pressing force acts parallel with said rotational axis, whereby jittering of said tape is reduced.

4,707,758

FAIL-SAFE SYSTEM IN A POWER REGULATION CIRCUIT FOR AN AUTOMOTIVE ELECTRONIC CIRCUIT

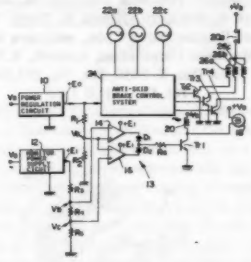
Toshiro Matsuda, Zama, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Sep. 24, 1982, Ser. No. 423,186

Claims priority, application Japan, Sep. 29, 1981, 56-152969

Int. Cl.[4] H02H *7/09, 7/093*

U.S. Cl. 361—18 **5 Claims**



1. A fail-safe system in a power regulation circuit of an automotive electronic circuit, comprising:

a power source producing unregulated output power;

the power regulation circuit connected to said power source and adapted to regulate said unregulated output power to produce regulated system power having a substantially constant output voltage, and to supply said regulated system power to said automotive electronic circuit;

a monitor power supply circuit connected to said power source independently of said power regulation circuit and adapted to produce a reference voltage to be compared with said output voltage of said power regulation circuit, said reference voltage representative of an allowable range of variation of said output voltage of said power regulation circuit; and

means for comparing said output voltage of said power regulation circuit with said reference voltage and for disabling said automotive electric circuit when said output voltage is out of said allowable range, and also for monitoring said reference voltage utilizing said output voltage of said power regulation circuit for detecting malfunction of said monitor power supply circuit to disable said automative electric circuit when malfunction of said monitor power supply circuit is detected.

4,707,759

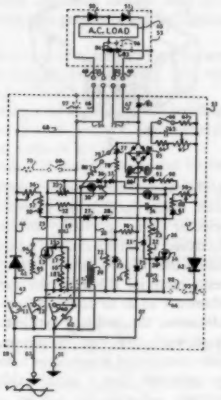
UNIVERSAL FAULT CIRCUIT INTERRUPTER

Lawrence E. Bodkin, 1149 Molokai Rd., Jacksonville, Fla. 32216

Continuation-in-part of Ser. No. 706,174, Feb. 27, 1985. This application Feb. 20, 1986, Ser. No. 831,642

Int. Cl.[4] H02H *3/16*

U.S. Cl. 361—48 **102 Claims**



1. In a power system the combination comprising a load and a first current blocking means connected in series to said load for passing substantial current in one direction through said load and passing substantially less current in the opposite direction, and a supply circuit connected to said load and adapted to connect said load to an alternating current source, said supply circuit including a second current blocking means for passing substantial current in said one direction through said load and passing substantially less current in said opposite direction, said supply circuit having a load current relay connected between said alternating current source and said load for supplying said substantial current from the alternating current source to load in said one direction through said first and second current blocking means, said supply circuit further including a unidirectionally triggered switching means connected between said alternating current source and said load for receiving current in a direction opposite to said one direction and connected between said alternating current source and said load current switching means to supply actuating current in said one direction to said load current relay, said load current relay being controlled by current from said unidirectionally triggered switching means, said supply circuit further including control means operatively connected in parallel to said undirectioinally triggered switching means for activating and deactivating said undirectionally triggered switching means and substantially reducing said actuating current to said load current relay through said undirectionally triggered switching means and substantially reducing said substantial current in said one direction supplied by said load current relay whenever a load providing current flow in said opposite direction is connected to said supply circuit.

4,707,760

MAINS PROTECTION DEVICE

Janan E. Allos, Walton-on-Thames, United Kingdom, assignor to Sollatek Limited, Monrovia, Liberia

Filed Sep. 27, 1985, Ser. No. 781,226

Int. Cl.[4] H02H *3/20*

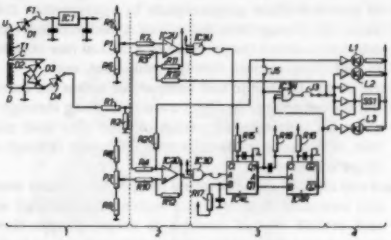
U.S. Cl. 361—90 **18 Claims**

1. A protection device, for an a.c. mains operated appliance, comprising:

means for defining upper and lower limits for a range of mains voltage values;

means for comparing the voltage peak value of selected half cycles of the mains with said upper and lower limits;

means for defining a predetermined time interval; and



means for providing a first signal state for disconnecting the appliance from the mains when the comparison indicates that said peak value is not within said range and a second signal state for reconnecting the appliance to the mains when said peak value subsequently remains within said range for said predetermined time interval.

4,707,761

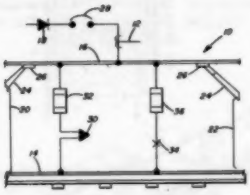
METHOD AND APPARATUS FOR DETECTING THE RATE OF RISE OF DIRECT CURRENT

David J. Podobinski, Washington, Pa., assignor to Consolidation Coal Company, Pittsburgh, Pa.

Filed May 17, 1985, Ser. No. 735,454

Int. Cl.[4] H02H *3/32*

U.S. Cl. 361—93 **18 Claims**



1. Apparatus for detecting a low level fault condition in an electrical system comprising,

a circuit breaker connected in series with a direct current conductor,

said circuit breaker being operable in a closed position to permit the flow of direct current through said direct current conductor and in the open position to terminate the flow of direct current through said direct current conductor,

a load shunt connected in series with said direct current conductor so that direct current flows through said shunt to said direct current conductor,

isolation means connected to said load shunt for generating an input signal proportional to the direct current flowing through said shunt, said input signal having a preselected waveform,

means for selecting the peak values of said input signal waveform generated by said isolation means and synchronizing on said peak values to provide a plurality of individual output signals corresponding to said peak values of said input signal waveform, one said individual output signal being provided at the beginning of a preselected time interval and a following individual output signal being provided at the end of said preselected time interval,

means for measuring the magnitude of said individual output

signal provided at the beginning of said preselected time interval and the magnitude of said individual output signal provided at the end of said preselected time interval and determining the change in magnitude of said output signals over said time interval,

comparator means for comparing said change in magnitude of said individual output signals to a preselected critical value of a change in magnitude over said preselected time interval to detect the presence of a critical rate of increase in said direct current through said shunt, and

a trip circuit latched to said comparator means for monitoring the net change in direct current flowing through said shunt for a preselected period of time after said critical rate of increase in direct current flowing through said shunt is detected,

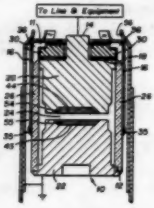
said trip circuit being energized to open said circuit breaker and terminate flow of direct current therethrough when said critical rate of increase in direct current flowing through said shunt is detected and the net change in direct current at the end of said preselected period of time exceeds a preselected limit.

4,707,762

SURGE PROTECTION DEVICE FOR GAS TUBE

Nerses N. Yapoujian, 2705 W. Arthur Ave., Chicago, Ill. 60645, assignor to Nerses Nick Yapoujian, Chicago, Ill.

Filed May 13, 1986, Ser. No. 862,707
Int. Cl.[4] H01T *4/10*; H02H *9/04, 3/22*
U.S. Cl. 361—124 **2 Claims**



1. Appartus for protecting a circuit from electrical overload comprising:

a gas-filled tube surge arrester with two electrodes, the first of which connects to the circuit to be protected and includes a post, and the second of which is connected to a ground, with said electrodes being separated by a gas-filled gap;

a sealed double air-gap type backup mechanism for conducting overload currents from the first electrode of the gas tube to ground in the event the gas tube fails to conduct the overload currents to ground, comprising:

a brazing ring; a cruciform torus-shaped electrically insulating ceramic member silk screened onto the flat surface of the said gas tube's first electrode, the upper surface of said ceramic member being metalized; and a grounded metal can or cap covering the ceramic dielectric and the top of the gas tube in such a manner as to create a sealed air gap between the outer walls of the ceramic member and the inner section of the can, and a sealed air gap between the outer surface of the post of the said gas tube's first electrode and the inner wall of the ceramic member,

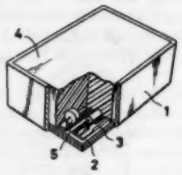
whereby, when installed, electric overload discharge may take place across either said air gap along said outer walls or inner wall of the ceramic member to the can to ground with a permanent short circuit formed from the protected line or equipment to ground.

4,707,763

MOLDED ELECTRONIC CIRCUIT DEVICE

Sinji Kudo, Yokohama, Japan, assignor to Stanley Electric Co., Ltd., Tokyo, Japan

Filed Dec. 21, 1984, Ser. No. 684,667
Int. Cl.[4] H05K *5/06*
U.S. Cl. 361—386 **3 Claims**



1. A molded electronic circuit device comprising:

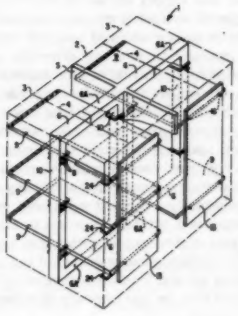
a printed circuit board having an electronic circuit, the electronic circuit being partially constituted by heat-radiating electronic elements such as a power transistor; a case for holding the printed circuit board; and a molding synthetic resin material filled in the case between the electronic elements so as to conduct heat away from the electronic elements, the molding synthetic resin material being obtained such that one of silicon carbide and a silicon carbide compound is mixed as a major constituent in an epoxy resin and that a metal oxide is added to a resultant mixture, wherein the silicon carbide and the silicon carbide compound comprise a powder whose particle size falls within the range of 6 to 10μ.

4,707,764

EQUIPMENT CABINET

Frederick T. Cogan, London, Canada, assignor to Mitel Corporation, Canada

Continuation of Ser. No. 688,345, Jan. 2, 1985, abandoned. This application Nov. 4, 1986, Ser. No. 928,626
Claims priority, application Canada, Jan. 23, 1984, 445817
Int. Cl.[4] H05K *1/14, 5/00*
U.S. Cl. 361—390 **7 Claims**



1. An equipment cabinet comprising:

(a) one or more identical first cabinet sections, each of said first cabinet sections including first and second open portions and a wall for separating said open portions, means for connecting the first and second open portions of respective ones of said cabinet sections to each other thereby forming one or more enclosed regions having said first and second open portions disposed at opposite ends thereof,

(b) a pair of additional cabinet sections, each of said addi-

tional cabinet sections including a further open portion bounded by a further wall,

(c) means for connecting the further open portions of said additional cabinet sections to the first and second open portions disposed at said opposite ends of said enclosed regions, thereby forming a shell comprised of said one or more first cabinet sections bounded at opposite ends by said additional cabinet sections,

(d) pairs of spaced guides fixed on each wall of said first cabinet sections, and each further wall of the additional cabinet sections, the guides being in alignment with each other,

(e) a first circuit board retainer retained between the guides,

(f) a circuit backplane for receiving and retaining circuit boards in conjunction with said retainer,

(g) means for fixing said backplane in a predetermined orientation relative to said retainer, and remotely of said first and additional cabinet sections,

whereby a plurality of said retainers can be held in approximate predefined positions in each divided portion of the shell, and alignment of said retainer and backplane is independent of the structure of said cabinet, and whereby a cabinet having multiple enclosed regions is formed with a plurality of pairs of spaced guides on opposite sides of each enclosed region.

4,707,765

PRINTED WIRING BOARD MOUNTED CONTROL INSTRUMENT

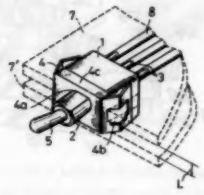
Shigeo Ohashi, Tokyo, Japan, assignor to Nihon Kaiheiki Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 19, 1985, Ser. No. 713,610

Claims priority, application Japan, Jul. 26, 1984, 59-155774; Oct. 3, 1984, 59-207515

Int. Cl.⁴ H05K *1/18*

U.S. Cl. 361—401 **13 Claims**



1. A control instrument being mounted on a printed wiring board having a recess formed therein, comprising:

a plurality of terminals, provided at a bottom surface and offset from a central plane of said control instrument, engaging electrical pattern portions formed at a bottom section of said recess; and

a resilient member provided over a top portion of said control instrument and having leg portions which extend over opposite side walls of said control instrument, said leg portions projecting outward at a central portion thereof and having apertures formed therein resiliently engaging inner walls of said recess.

4,707,766

MODULAR, COMPOSABLE LIGHTING PROJECTOR FOR ILLUMINATION FROM THE GROUND

Marcello Bertozzi, and Roberto Casamento, both of Rome, Italy, assignors to Quarzcolor Ianiro S.p.A., Rome, Italy

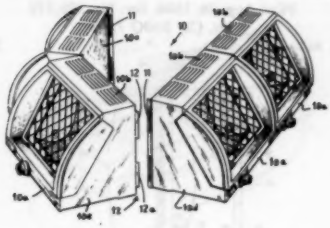
Filed Jun. 5, 1985, Ser. No. 741,683

Claims priority, application Italy, Jun. 7, 1984, 35870/84[U]

Int. Cl.⁴ G03B *15/02*

U.S. Cl. 362—11 **2 Claims**

1. A plurality of lamp housing modules particularly for lighting in theaters, photographs, motion picture or television studios, the housing modules each having a front side, a top side, a back wall, and a pair of first and second end walls, the back wall joining said end walls along first and second back upright edges, said housing modules each having a lighting window on said front side and ventilation louvers on said top side and containing a bulb and mirror set, a flange member at said first upright edge of each housing module having slots forming hinge receiving means, tab members extending from



said second upright edge forming hinge insertion means insertable into said slots of the flange members of an adjacent like housing module to form a hinge therewith, a hook device extending from and close to a lower portion of said front side and a hook receiving means complementary to said hook device at a lower portion of said front side of an adjacent like housing module, whereby a plurality of said housings may be connected into a housing row of desired configuration.

4,707,767

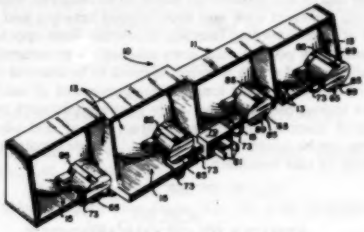
MOTOR VEHICLE HEADLIGHT MODULE

John A. Bergin, Hancock, N.H., and George J. English, Reading, Mass., assignors to GTE Products Corporation

Filed Mar. 17, 1986, Ser. No. 840,271

Int. Cl.⁴ B60Q *1/00*

U.S. Cl. 362—61 **13 Claims**



1. A motor vehicle headlight module comprising:

a plastic reflector having a forward opening and a rear neck portion;

a low wattage tungsten halogen capsule sealed within said reflector, said capsule including a glass envelope and a pair of conductive lead-in wires projecting from said envelope and passing through a wall of said rear neck portion of said reflector;

sealing means secured to said reflector to provide a cover for said forward opening, said sealing means being light-transmitting to enable light from said capsule to pass therethrough;

connector means removably positioned on said rear neck portion of said reflector in a slidable manner, said connector means including contact means therein for being electrically coupled to said projecting lead-in wires of said capsule when said connector means is positioned on said reflector; and

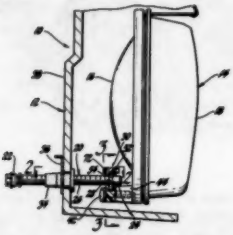
retention means secured to or forming part of said reflector and projecting therefrom for positively engaging said connector means to retain said connector means on said neck portion of said reflector in a locked manner.

4,707,768

RETAINER ASSEMBLY

Daniel A. Ball, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 26, 1986, Ser. No. 900,370
Int. Cl.[4] B60Q *1/06*
U.S. Cl. 362—66 **2 Claims**



1. In combination with a headlamp mounted in a support bracket, an adjustment screw carried by said support bracket for selectively moving said headlamp, one end of said adjustment screw having head means configured for operational engagement with a tool by which the screw is rotated, the other end of said adjustment screw being formed with a reduced annular neck, a retainer assembly fixed to said headlamp for connecting said other end of said adjustment screw to said headlamp, said retainer assembly including a central body portion having an cavity formed therein so as to define a pair of axially spaced forward and rear walls, each of said walls having a circular aperture formed therein along an axis coincidental with the rotational aixs of said adjustment screw, said other end of said adjustment screw to be received within each of said apertures with said neck located between said walls, a pair of arms extending laterally outwardly from opposed sides of said body portion, said arms adapted to be secured to said headlamp, and a lock member adapted to be inserted into said cavity for preventing longitudinal movement of said adjustment screw relative to said body portion, said neck rotatably secured thereto whereby said other end of said adjustment screw can be rotated so as to cause adjustable pivotable repositioning of said headlamp.

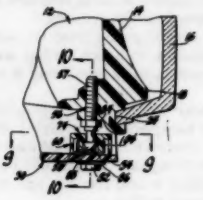
4,707,769

VEHICLE HEADLAMP ASSEMBLY

Paul D. Van Duyn, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 30, 1986, Ser. No. 880,090
Int. Cl.[4] B60Q *1/06*; F21V *3/18*
U.S. Cl. 362—66 **3 Claims**

1. In combination with a vehicle lamp assembly having a support frame with opposed walls, a rectangular lamp body received between said frame walls and having the lower opposed corners of said lamp body provided with ball and socket means for supporting the lamp body for adjustable movement about a horizontal axis, and upper pivot means and lower pivot means on said frame walls and said lamp body aligned on a vertical axis about which said lamp body is adapted for rotatable adjustment relative to said frame, said vertical axis being located between said ball and socket means and said upper pivot means including a threaded fastener adapted to adjust the position of said lamp body about said horizontal axis, said lower pivot means being nonload supporting and comprising a pivot seat member and a pivot stud, said pivot stud having a frusto-conical head formed at one end and a threaded shank at the other end, said pivot seat member including a block member made of a plastic material and having a stepped bore with a shoulder formed therein for receiving said conical head of said pivot stud, said stepped bore being formed by segmented sections integral with said block member adapted to flex radi-



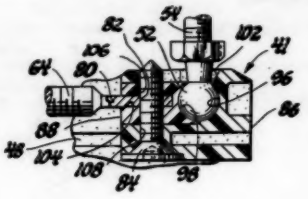
ally outwardly when said conical head is inserted into said bore and return to the normal position for retaining the conical head within the bore when said conical head moves beyond said shoulder, and a spring member surrounding said segmented sections for preventing removal of said conical head from said bore.

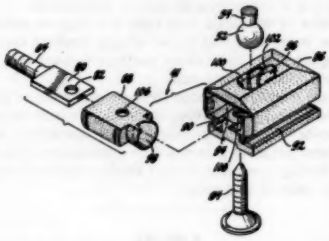
4,707,770

SUPPORT SHOE FOR A VEHICLE HEADLAMP ASSEMBLY

Paul D. Van Duyn, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 16, 1986, Ser. No. 886,147
Int. Cl.[4] B60Q *1/06*
U.S. Cl. 362—66 **3 Claims**





1. In combination with a vehicle headlamp assembly having a lamp body received between frame walls of a support frame and including pivot means on said frame walls and said lamp body aligned on a vertical axis about which said lamp body is adapted for rotatable adjustment relative to said frame, a guidance slot in said frame positioned to one side of said axis and generally aligned on an arc originating on said vertical axis, a support shoe slidably received in said slot to support the lamp body on said frame and connected to an adjustment means

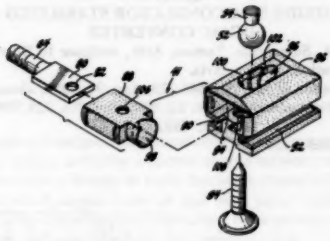
which effects adjustment of said lamp body about said vertical axis, said support shoe comprising two interconnecting parts which consist of a block member and a retaining member, said block member having a pair of laterally spaced longitudinally extending channels formed on opposite sides of said block member for cooperating with said guidance slot in said frame for allowing sliding movement therealong, a cavity formed in said block member for receiving the ball portion of a ball stud secured to said lamp body and having a first spherical surface for engagement with said ball portion, said retaining member adapted to be inserted into said cavity and having a second spherical surface for engaging said ball portion and cooperating with said first spherical surface to provide a socket for and retain the ball portion of said ball stud within said block member.

4,707,771

SUPPORT SHOE FOR A VEHICLE HEADLAMP ASSEMBLY

Paul D. Van Duyn; David R. McMahan; John D. Geddie, and William E. Nagengast, Jr., all of Anderson, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Jul. 16, 1986, Ser. No. 886,150
Int. Cl.[4] F21V *3/18*
U.S. Cl. 362—66 **2 Claims**



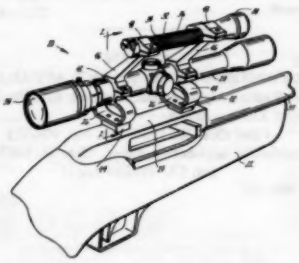
1. In combination with a vehicle headlamp assembly having a lamp body received between frame walls of a support frame and including pivot means on said frame walls and said lamp body aligned on a vertical axis about which said lamp body is adapted for rotatable adjustment relative to said frame, a guidance slot in said frame positioned to one side of said axis and generally aligned on an arc originating on said vertical axis, a support shoe slidably received in said slot to support the lamp body on said frame and adapted to be connected to an adjustment means which effects adjustment of said lamp body about said vertical axis, said support shoe including a block member and a retaining member, said retaining member having a first cavity for receiving one end of said adjustment means, said block member having a pair of laterally spaced longitudinally extending channels formed on opposite sides of said block member for cooperating with said guidance slot in said frame for allowing sliding movement therealong, a second cavity formed in said block member for receiving the ball portion of a ball stud secured to said lamp body and having a first spherical surface for engagement with said ball portion, said retaining member adapted to be inserted into said second cavity and having a second spherical surface for engaging said ball portion and cooperating with said first spherical surface for capturing and retaining the ball portion of said ball stud within said block member, and a common lock means for fixedly interconnecting said block member, said retaining member, and said one end of said adjustment means.

4,707,772

FIREARM SIGHT AND FLASHLIGHT MOUNTING SYSTEM

Ivan Jimenez, and Irving N. Rubin, both of 5555 Treadwell, Wayne, Mich. 48184

Filed Oct. 21, 1986, Ser. No. 921,331
Int. Cl.[4] F41G *1/34*
U.S. Cl. 362—110 **24 Claims**



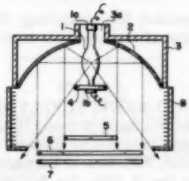
1. In combination with a firearm having a barrel, two cylindrical devices in the form of a flashlight and a telescope sight respectively, and means for mounting said two devices on the firearm comprising a lower member means, means for attaching the lower member means to the firearm, said lower member means comprising means forming an upwardly facing receptacle means receiving one of said cylindrical devices, intermediate member means having a downwardly facing clamping means cooperatively associated with the upwardly facing receptacle means of the lower member means for clamping between them said one cylindrical device, said intermediate member means having an upwardly facing receptacle means spaced above said downwardly facing clamping means, said second-mentioned receptacle means receiving the other of said cylindrical devices and upper member means comprising means cooperatively associated with said second-mentioned receptacle means for clamping the other of said cylindrical devices.

4,707,773

PARALLEL LIGHT MOVING TYPE EXPOSURE APPARATUS

Hiroshi Miyamoto, Tokyo, Japan, assignor to ORC Manufacturing Co., Ltd., Tokyo, Japan

Filed Aug. 8, 1986, Ser. No. 894,917
Claims priority, application Japan, Apr. 28, 1986, 61-98936
Int. Cl.[4] F21V *7/00*
U.S. Cl. 362—303 **8 Claims**



1. A light generator for directing parallel light rays perpendicularly toward a material to be exposed in a parallel light moving-type exposure apparatus wherein the light generator and the material to be exposed are moved relative to one another to perform the exposure, the light generator comprising:

a reflector, said reflector having a concave, curved surface directed toward the material to be exposed;

a light source disposed intermediate said concave, curved surface and the material to be exposed;

a first light-shielding means disposed between said light source and the material to be exposed for preventing light rays emitted from said light source from being directly irradiated onto the material to be exposed; and

a second light-shielding means for enabling the uniform distribution of light rays on the material to be exposed, said second light-shielding means being disposed intermediate said first light-shielding means and the material to be exposed.

4,707,774

FLYWHEEL POWER SOURCE APPARATUS

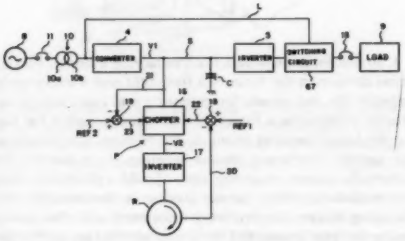
Takeyoshi Kajita, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Oct. 30, 1986, Ser. No. 924,871

Claims priority, application Japan, Oct. 31, 1985, 60-244593

Int. Cl.[4] H02M *5/451*

U.S. Cl. 363—37 **6 Claims**



1. A flywheel power source apparatus comprising a main circuit having a converter for converting AC (alternating current) power source output into DC (direct current) output and a first inverter for converting the DC output of the converter into AC output and supplying it to a load, a flywheel device supplied with power from the main circuit and driven for rotation, and a compensation circuit for supplying the stored energy based on the rotational energy of the flywheel device to the first inverter of the main circuit,

wherein said compensation circuit is composed of

a chopper circuit for controlling the voltage of the power supplied from the converter to the flywheel device in the normal state and of the power supplied from the flywheel device to the first inverter during service interruption;

a second inverter for controlling the frequency of the power supplied in the normal state and the power supplied during service interruption;

a first comparator for controlling the chopper circuit based on the output of the flywheel device during service interruption; and

a second comparator for controlling the chopper circuit based on output of the converter in the normal state.

4,707,775

FREE RUNNING CURRENT SUPPLY FOR A MONITOR

Hubert Panse, and Wolfgang Schlegel, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 8, 1986, Ser. No. 904,641

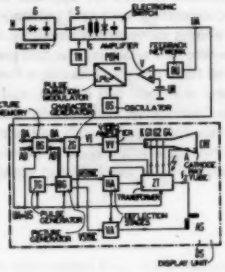
Claims priority, application Fed. Rep. of Germany, Sep. 27, 1985, 3534532

Int. Cl.[4] H04N *5/63*

U.S. Cl. 363—37 **3 Claims**

1. In a current supply device of the type for supplying the screen of a communications terminal, having a clock-controlled voltage converter which, from a commercial AC voltage supply, generates at least one DC voltage which is suitable for operation of the screen, and of the type having a deflecting device operatively associated with the screen with a predetermined line frequency, the improvement therein comprising:

an electronic switch for controlling the voltage converter; and



means for providing the electronic switch with a switching frequency which is midway between two consecutive multiples of the line frequency of the screen.

4,707,776

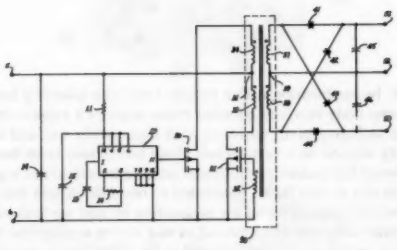
METAL OXIDE SEMICONDUCTOR STABILIZED DC TO DC/AC CONVERTER

Thomas A. Somerville, Tucson, Ariz., assignor to Burr-Brown Corporation, Tucson, Ariz.

Continuation of Ser. No. 646,225, Aug. 30, 1984, abandoned. This application Nov. 12, 1986, Ser. No. 929,758

Int. Cl.[4] H02M *7/538*

U.S. Cl. 363—134 **8 Claims**



1. A dc to dc/ac converter comprising:

a transformer having a primary consisting of a first primary winding, a second primary winding, and a feedback winding, said transformer also comprising a first secondary winding and a second secondary winding;

a first metal oxide transistor coupled to said first primary winding for controlling conduction of current through said first primary winding during a first portion of a cycle;

a CMOS multivibrator connected to said first transistor, said multivibrator providing an activation signal; and

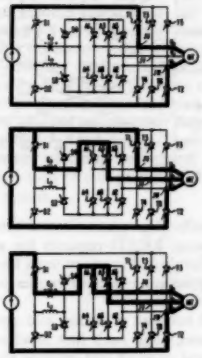
a second metal oxide transistor coupled to said second primary winding, said second metal oxide transistor controlling conduction of current therethrough, said second metal oxide transistor being coupled to said feedback winding between a gate and a source of said second metal oxide transistor, said feedback winding causing said second metal oxide transistor to be conducting during a second portion of said cycle.

4,707,777

PRECOMMUTATED CURRENT SOURCE INVERTER

Gyu-Hycong Cho, Seongbuk, Rep. of Korea, assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 5, 1986, Ser. No. 871,049
Int. Cl.[4] H02M 7/521
U.S. Cl. 363—138 11 Claims



1. In an auto-sequential commutated current source inverter (ASCI) system including a current source between main input DC terminals, a bridge of main thyristors connected across a positive and a negative one of said main input terminals and sequentially controlled for conduction between said main DC terminals and a set of output AC terminals; and

commutation capacitor means resonantly charged and discharged between said main DC terminals and said AC terminals for commutating said main thyristors, the combination of

a bridge of auxiliary thyristors connected between two auxiliary terminals and sequentially controlled for conduction between said auxiliary terminals and said AC terminals;

a first series-combination of said capacitor means and of first switching means, said first switching means being connected across said DC terminals and having a first nodal point therebetween, said capacitor means being connected between said first nodal point and each of said auxiliary terminals;

a second series-combination of inductance means and of second switching means, said second switching means being connected in antiparallel to said auxiliary bridge across said auxiliary terminals, and having a second nodal point therebetween, said inductance means being connected between said first and second nodal points;

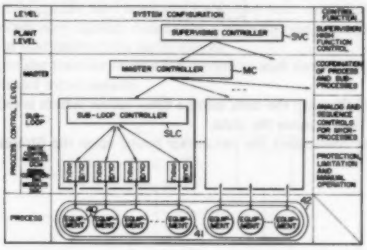
with said capacitor means being initially charged to a maximum voltage appropriate to commutate the outgoing main thyristor, said first series-combination being controlled for conduction together with one auxiliary thyristor of matching polarity to discharge said capacitor means to a precommutation level lesser than said maximum voltage and of at least the turn-OFF voltage for the main thyristor next to be turned-OFF.

4,707,778

CONTROLLER FOR HEAT POWER PLANT

Hiroshi Yamada, Hitachi; Michihiro Iioka; Akira Sugano, both of Katsuta; Atsushi Takita, Mito; Seiitsu Nigawara, and Masayuki Fukai, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 8, 1985, Ser. No. 752,855
Claims priority, application Japan, Jul. 9, 1984, 59-140533; Jul. 20, 1984, 59-149526
Int. Cl.[4] G06F 15/46, 15/16, 11/16
U.S. Cl. 364—132 10 Claims



1. A controller for a heat power plant comprising:

a master controller for receiving a load demand and a plurality of plant data from the heat power plant and producing command signals on at least two of electric power, feed water flow rate, fuel flow rate, air flow rate and recirculation gas flow rate of the plant required to achieve the load demand;

a plurality of sub-loop controllers independently provided for respectively receiving said command signals for producing control quantities for controlling control ends in accordance with the command signals;

a plurality of drive means provided one for each of the control quantities supplied by the sub-loop controllers; and

a plurality of plant data detection means for detecting the plant data and delivering the plant data to said master controller or said sub-loop controllers,

said sub-loop controllers including processor means respectively for determining a substitute command signal on the basis of the plant data and issuing the substitute command signal to the sub-loop controllers for producing control quantities when the master controller fails.

4,707,779

PROCESS FOR CONTROLLING A PARAMETER BASED UPON FILTERED DATA

Hung-Tzaw Hu, San Jose, Calif., assignor to Measurex Corporation, Cupertino, Calif.

Filed Nov. 20, 1984, Ser. No. 673,966
Int. Cl.[4] G01N 25/56
U.S. Cl. 364—148 9 Claims

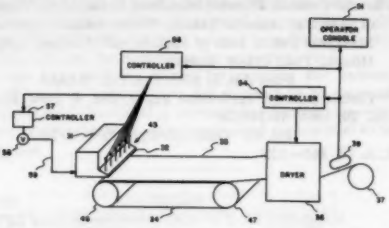
1. A process for controlling a parameter of a sheet material which is being manufactured, comprising:

(a) causing the sheet material to travel;

(b) moving a scanning means across the sheet a plurality of times, i;

(c) measuring a parameter of the sheet with the scanning

means in a plurality of zones, j, which are disposed side-by-side across the sheet to produce a plurality of data;



(d) filtering the data using a filter factor which is calculated based upon the data;

(e) controlling the parameter based upon the filtered data.

4,707,780

METHOD AND APPARATUS FOR REDUCING TRACK ERRORS IN COMPUTER CONTROLLED MACHINE TOOLS OR INDUSTRIAL ROBOTS

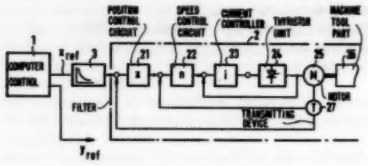
Horst Gose, and Wolfgang Papiernik, both of Erlangen, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Continuation of Ser. No. 708,443, Mar. 5, 1985, abandoned. This application Mar. 6, 1987, Ser. No. 22,551

Claims priority, application Fed. Rep. of Germany, Mar. 8, 1984, 3408551

Int. Cl.[4] G05B *13/04*; G06F *15/46*

U.S. Cl. 364—176 **4 Claims**



1. A method for reducing track errors in computer controlled machine tools or industrial robots in which distance reference values for the drive control circuits supplied by a computer in a reference value channel determine the track and the track velocity, wherein track direction and track velocity are expressed by a track vector and wherein the drive control circuits include controllers of low order, further comprising inserting an auxiliary filter in the reference value channel of each drive control circuit, which filter has approximately the inverse transfer behavior of the associated drive control circuit, feeding the auxiliary filter with control signals corresponding to changes in the track ventor and switching the auxiliary filter directly between the output of the computer and the reference value input of the respective drive control circuit.

4,707,781

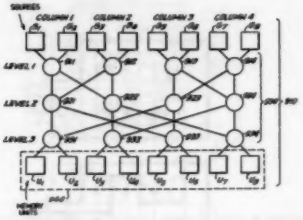
SHARED MEMORY COMPUTER METHOD AND APPARATUS

Herbert W. Sullivan, and Leonard A. Cohn, both of New York, N.Y., assignors to Chopp Computer Corp., La Jolla, Calif.

Division of Ser. No. 254,583, Apr. 15, 1981, Pat. No. 4,484,262, which is a continuation of Ser. No. 2,004, Jan. 9, 1979, abandoned. This application Nov. 19, 1984, Ser. No. 673,159

Int. Cl.[4] G06F *13/00*

U.S. Cl. 364—200 **23 Claims**



1. A system for effecting communication between a plurality of sources generating READ requests for access to stored information and plurality of memory units for containing said information and generating READ replies containing same, said system comprising:

(a) a multi-level network of nodes, said network including first level nodes, each such first level node being connected to plural ones of said sources for receiving said READ requests, second level nodes, each such second level node being connected to plural ones of said memory units for accessing same to receive READ replies to said READ requests and at least one further level of nodes, each such further level node interconnecting plural ones of said first level nodes to plural ones to said second level nodes to convey said READ requests and READ replies therebetween;

(b) storage means at each such node for containing indicia of said READ requests; and

(c) distributor means at each such node connected to said storage means of said node for determining whether an indicia of a READ request received at said node (1) is contained or (2) is not contained in said storage means, said distributor means both permitting conveyance of a received such READ request through said node and storing an indicia of that READ request in said storage means upon such determination (2) therefor and denying conveyance of a received such READ request through said node upon each such determination (1) therefor, said distributor means also forwarding READ replies to all sources requesting same.

4,707,782

METHOD FOR EFFECTING ONE TIMER INTERRUPT FOR MULTIPLE PORT COMMUNICATION

Steve Dumbovic, Elmhurst, and Mark A. Dempsky, Villa Park, both of Ill., assignors to Illinois Tool Works Inc., Chicago, Ill.

Filed Sep. 7, 1984, Ser. No. 648,869

Int. Cl.[4] G06F *13/22*

U.S. Cl. 364—200 **9 Claims**

1. A method for employing a processing apparatus in a host device for full duplex communications through a plurality of ports, said processing apparatus having one timer and executing functions in response to a program of instructions, said communications occurring at a baud rate, said baud rate being expressed as a plurality of bit time intervals; the method comprising:

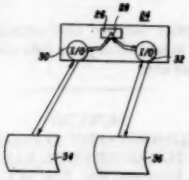
effecting a plurality of interruptions of said program of instructions at a frequency with said timer, said frequency defining a plurality of sub-bit time intervals within each of

said plurality of bit time intervals, each of said plurality of interruptions establishing commencement of one of said plurality of sub-bit time intervals;

said host device encoding data and queuing said data, said host device identifying said queued data for subsequent transmission through predetermined ports of said plurality of ports in response to a transmission instruction from said processing apparatus;

employing said program of instructions to respond to one interruption of said plurality of interruptions during each of said plurality of bit time intervals by immediately executing said transmission instruction to said host device, said host device effecting transmission of said queued data through said predetermined ports, said program immediately executing an input checking instruction upon completion of said transmission of said queued data, said input checking instruction causes said host device to poll each of said plurality of ports for presence of an input signal;

employing said program of instructions to respond to each of said plurality of interruptions other than said one interruption by immediately executing said input checking instruction, said input checking instruction causing said host device to poll each of said plurality of ports for presence of an input signal;



employing said program of instructions to respond to an initial detection of an input signal during a first bit time interval at a respective port of said plurality of ports by establishing the sub-bit time interval of said plurality of sub-bit time intervals which is concurrently extant with said initial detection of said respective port as an initial data sub-bit time interval for said respective port and by establishing the sub-bit time interval of said plurality of sub-bit time intervals which next follows said initial data sub-bit time interval as a confirmed data sub-bit time interval for said respective port;

employing said program of instructions to respond to a second detection of an input signal during a confirmed data sub-bit time interval for said respective port by recognizing said second detection as a valid input signal for said respective port, by reading said valid input signal for said respective port into said host device, and by continuing to read said valid input signal for said respective port into said host device during bit time intervals of said plurality of bit time intervals occurring subsequent to said first bit time interval within sub-bit time intervals of said plurality of sub-bit time intervals occurring within said subsequent bit time intervals in corresponding sequential order to occurrence of said confirmed data sub-bit time interval within said first bit time interval.

4,707,783

ANCILLARY EXECUTION UNIT FOR A PIPELINED DATA PROCESSING SYSTEM

Hsiao-Peng S. Lee; Stephen J. Rawlinson, both of Sunnyvale, and Stephen S. C. Si, Milpitas, all of Calif., assignors to Amdahl Corporation, Sunnyvale, Calif.

Filed Oct. 19, 1984, Ser. No. 662,966

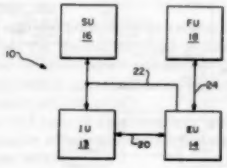
Int. Cl.[4] G06F *3/00*

U.S. Cl. 364—200 **12 Claims**

1. An ancillary execution unit interfaced to a primary execution unit of a pipelined data processing system for processing data in response to an instruction of a pipeline flow of instructions, said primary execution unit having instruction input means for receiving said instruction, operand input means for receiving said data and operand output means for transferring processed data from said primary execution unit to said data processing system appropriate for the pipeline flow of said instruction wherein said instruction requires a plurality of cycles to process data and wherein said instruction input, operand input and operand output means operate in respective cycles of a sequence of cycles with respect to said instruction, and wherein said primary execution unit further includes alert means for providing an early notice signal to said data processing system at a first time point prior to the termination of said sequence of cycles, said ancillary execution unit comprising:

(a) instruction transfer means for obtaining said instruction from said instruction input means;

(b) operand transfer means for obtaining said data from said operand input means;



(c) ideal condition detection means for determining whether said data is ideal with respect to said instruction;

(d) execution means for performing the processing indicated by said instruction on said data;

(e) result transfer means for returning processed data to said primary execution unit appropriately for the pipeline flow of said instruction; and

(f) sequencing means, responsive to said ideal condition detection means, for selecting and enabling in an operative sequence said instruction transfer, operand transfer, execution and result transfer means within said sequence of cycles;

said sequencing means further comprising ancillary alert means for providing an ancillary early notice signal to said alert means in said primary execution unit at a second time point prior to the termination of said sequence of cycles, said second time point being prior to or concurrent with said first time point.

4,707,784

PRIORITIZED SECONDARY USE OF A CACHE WITH SIMULTANEOUS ACCESS

Charles P. Ryan, Phoenix, and Russell W. Guenthner, Glendale, both of Ariz., assignors to Honeywell Bull Inc., Phoenix, Ariz.

Continuation of Ser. No. 470,126, Feb. 28, 1983, abandoned. This application Aug. 6, 1986, Ser. No. 894,082

Int. Cl.[4] G06F *13/14;* **G11C** *7/00*

U.S. Cl. 364—200 **1 Claim**

1. A central processor of a digital computer system comprising:

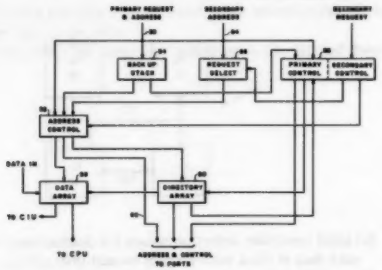
a store into cache memory, said cache memory including memory array storage means for computer data, operands or instructions, or both, having an address; and primary and secondary access control means responsive to access request signal sets being applied to said primary and secondary access control means, where each access request signal set includes an address of computer data and instruction signals for controlling the operation of the cache memory, for causing the memory array storage means to execute substantially simultaneously the instruction signals of two access request signal sets applied to the memory array by the primary and secondary access control means substantially simultaneously;

central unit pipeline structure (CUPS) means for executing instructions in pipeline fashion and for producing an access request signal set for each instruction in execution;

first circuit means for applying exclusively access request signal sets produced by the CUPS to the primary access control means of the cache memory;

a paging unit of the CUPS for correlating a virtual address and a real address and for producing the address of computer data included in each access request signal set produced by the CUPS and for producing access request signal sets of computer data used by the paging unit in producing the address signals of access request signal sets applied to the secondary access control means of the cache memory;

a ports unit of the central processor for accessing the main memory of the digital computer system and for producing



access request signal sets of computer data for writing computer data into the memory array storage means of the cache memory and for reading computer data out of the memory array storage means of the cache memory;

an instruction fetch unit of the central processor for producing access request signal sets of instructions;

second circuit means for applying in parallel access request signal sets produced by the paging unit of the CUPS, the ports unit and the instruction fetch unit to the secondary access control means of the cache memory; and

means for prioritizing which of the access request signal sets applied to the secondary access control means waiting executing is to be placed in execution by the memory array storage means based on the function of the instruction signals of the sets of access request signal sets applied thereto.

4,707,785

ELECTRONIC CASH REGISTER WITH MEANS TO ENTER DISCOUNT PRICES DIRECTLY BY KEYBOARD

Hiroshi Takagi, Kyoto, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Jul. 29, 1985, Ser. No. 759,744

Claims priority, application Japan, Jul. 27, 1984, 59-158123

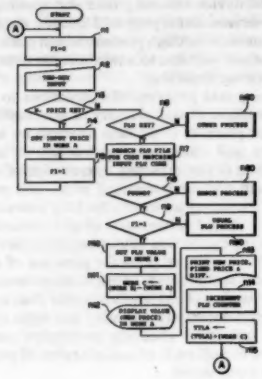
Int. Cl.[4] G06F *15/21*; G07G *1/00*

U.S. Cl. 364—405 **3 Claims**

1. An electronic cash register including memory means containing a PLU file in which the fixed price data for a commodity item is previously stored, a keyboard including a PLU key which, when activated, recalls the fixed price data for the appropriate commodity item from the PLU file and a ten-key pad, and a printer for printing out the data on a receipt slip, whereby the entry operation is performed by operating the keys on the keyboard, which comprises:

an identifying key provided on said keyboard and activated to identify the price data entered from said keyboard as the new price data;

means for calculating a difference between the new price data as entered by using the ten-key pad on the keyboard and identified by activating said identifying key and the fixed price data for the appropriate item recalled from the PLU file; and



means for printing out said new price data and difference data as well as said fixed price data stored in the PLU file on the receipt slip.

4,707,786

COMPUTER TOMOGRAPHY SYSTEM AND METHOD FOR OPERATING SAME

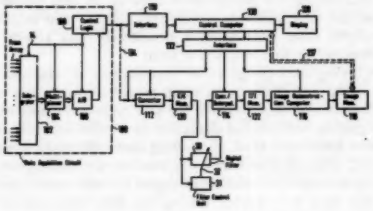
Guenter Dehner, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Oct. 29, 1984, Ser. No. 666,247

Claims priority, application Fed. Rep. of Germany, Nov. 23, 1983, 3342353

Int. Cl.[4] G06F *15/42*

U.S. Cl. 364—414 **8 Claims**



1. In a method for operating a computer tomography system including the steps of rotating a fan-shaped radiation beam around an examination subject, said radiation being incident on a detector array consisting of a plurality of individual detectors, each said detector generating an electrical signal corresponding to the intensity of radiation incident thereon, processing said signals for generating an image of the plane of the examination subject within said fan-shaped radiation beam including correcting said signals from said detectors to provide corrected data points, convolving said data points with a deblurring function to provide convolved data points, and reconstructing said image from said convolved data points, the improvement comprising the steps of:

filtering said corrected data points in an adaptive digital filter to which said corrected data points are supplied as input signals before convolving said corrected data points, said filter having a transfer function; and

continuously controlling the transfer function of said filter as

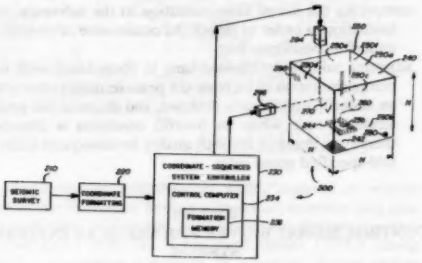
a function of the input signals of said filter for suppressing noise in said input signals.

4,707,787

BEAM-ACTIVATED COMPLEX-SOLID FORMATION UTILIZING PATTERN-INDEPENDENT, COORDINATE-SEQUENCE CONSTRUCTION

Carl H. Savit; Rhonda Boone, and Mark Doyle, all of Houston, Tex., assignors to Western Geophysical Company of America, Houston, Tex.

Filed Jan. 10, 1985, Ser. No. 690,219
Int. Cl.[4] G11C *13/00, 13/04*
U.S. Cl. 364—420 **39 Claims**



22. In a beam-activated object-formation system which includes computer means configured for the control of a subject formation process, with said computer means in turn including a formation-control memory, a construction method comprising;

(A) establishing an object-formation volume which includes:

(1) a plurality of planar, construction-support, peripheral-surface members mutually configured to contain said volume with a predetermined one of said surface members being designated as an origin plane; and

(2) a volume-penetrating, construction-support anchor-rod disposed perpendicularly meeting the geometric center of said origin plane;

(B) establishing with respect to said volume a voxel-referenced, volumetrically-rectangulated cylindrical co-ordinate system having:

(1) a predeterminately-oriented cylindrical axis whose voxel-referenced units index successive, parallel, volumetrically-contiguous voxel layers disposed perpendicular to said axis;

(2) an intra-layer succession of voxel-referenced squared loci, disposed both mutually-parallel and mutually-concentric with respect to said axis, where:

(a) each of said loci comprises a squared-perimeteral succession of contiguous voxels;

(b) each of said loci is assigned a radial index whose voxel-referenced units indicate the minimum distance from said cylindrical axis to the outside of the given square; and

(c) each voxel within each of said loci is assigned an angular index locationally indicative of ordinal position within the given perimeteral succession; and

(3) a zero-layer, zero-radius origin, where said coordinate system as established is disposed both with said origin located at the geometric center of said origin plane and with said cylindrical axis coaxially aligned with said perpendicularly-disposed anchor rod;

(C) providing with respect to said volume a voxel-referenced specification pattern of desired-object configuration; and

(D) forming said object by co-ordinately sequencing through said volume, constructionally writing at sequence-encountered, pattern-specified voxels, where:

(E) with respect to the layers, radii and angles of said cylindrical coordinate system, said co-ordinate sequencing is initiated at the zero-layer, zero-radius origin of said system and is performed on a successive radius-by-radius basis, with the sequencing for each radius then being performed on a successive layer-by-layer basis, and with the sequencing within each radially-referenced layer then in turn being performed on a successive angle-by-angle basis; and where

(F) said sequenced constructional writing includes the steps of:

(1) establishing within said formation-control memory a write-control field having control locations referenced to the voxels of said volume's co-ordinate system, where:

(a) each of said locations includes a status flag indicative of whether the associated voxel is pattern-designated for writing; and

(b) each of said locations includes a status flag indicative of whether the associated voxel is structurally supported by being disposed volumetrically contiguous to a determinable one of either said support means or a previously-written voxel;

(c) each of said control-field locations includes a status flag indicative of whether the subject voxel has previously been written;

(2) supplying said specification pattern to said control field by altering to write status those control locations associated with said voxel-referenced pattern; and

(3) performing said object formation by:

(a) sequencing through said control field, constructionally writing at substantially only those locations which are both pattern-designated and supported, where following a supported writing at any given location:

(i) the subject location is altered to previously-written status; and

(ii) volumetrically-contiguous locations are altered to support status;

(b) returning for resequencing to previously-sequenced locations which are both pattern specified and presently supported but which were not previously written because of not having been supported at the time of said previous sequencing; and

(c) by-passing those sequence-encountered locations which are in previously-written status.

4,707,788

AUTOMATIC ADJUSTER FOR AUTOMOBILE DRIVER EQUIPMENT

Syuzaburo Tashiro, Okazaki; Toshikazu Ina, Nagoya; Masahiro Taguchi, Aichi; Sadahisa Onimaru, Nishio; Osamu Nakano, Aichi, and Akira Kuno, Obu, all of Japan, assignors to Nippon Soken, Inc, Nishio and Nippondenso Co., Ltd., Kariya, both of, Japan

Filed Jul. 10, 1985, Ser. No. 753,553
Claims priority, application Japan, Jul. 10, 1984, 59-143739
Int. Cl.[4] B60N *1/02;* **G06F** *15/20*
U.S. Cl. 364—424 **10 Claims**

1. An automatic adjuster for automobile driver equipment adjusted in accordance with a figure and dimensions of an individual driver, such as a seat and mirrors, comprising:

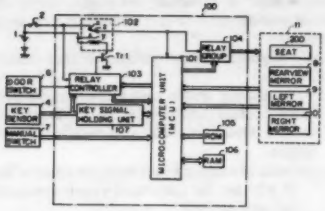
detachable information means having information indicative of said individual driver and carried by said driver for access to the automobile;

reading means mounted in said automobile for reading information on said information means when used for access to said automobile;

manual adjustment means for manually adjusting said driver equipment;

control means connected with said reading means and said

manual adjustment means for providing control outputs in response to outputs of said reading means and said manual adjustment means, said control outputs being responsive to said outputs of said reading means indicative of the information read by said reading means, and responsive to said manual adjustment means to determine whether said driver equipment is being manually adjusted,



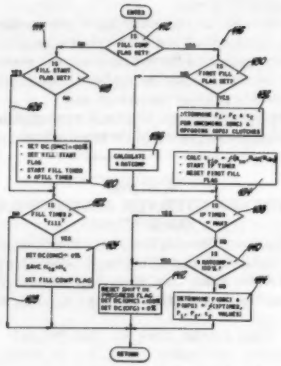
driving means connected with said control means for adjusting said driver equipment based on said control outputs from said control means to cause a moving speed of said driver equipment to be a first slow speed when said driver equipment is manually adjusted, and a second fast speed at least when said driver equipment is not being manually adjusted.

4,707,789

ADAPTIVE DIRECT PRESSURE SHIFT CONTROL FOR A MOTOR VEHICLE TRANSMISSION

Robert C. Downs, Ortonville; Larry T. Nitz, Troy, and Joseph L. Wanamaker, Rochester, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 29, 1985, Ser. No. 802,676
Int. Cl.[4] B60K *41/08*
U.S. Cl. 364—424.1 **14 Claims**



1. In a shift control system for a motor vehicle multiple speed ratio automatic transmission having a fluid operated torque establishing device associated with a specified speed ratio and a source of fluid pressure, wherein shifting from a currently engaged speed ratio to said specified speed ratio includes a preparation phase during which fluid is supplied from said source to the torque establishing device for a predetermined time to fill the same in preparation for torque transmission, and a completion phase during which further fluid is supplied to the torque establishing device to initiate and progressively increase the transmission of torque therethrough, a method of adaptively correcting the predetermined time for sources of error which degrade the shift quality by causing an overfill condition wherein the initiation of torque transmission through the torque establishing device occurs prior to the commencement of the completion phase or an underfill condition wherein the initiation of torque transmission through the torque establishing device occurs after the commencement of the completion phase, said method comprising the steps of:

detecting the occurrence of a change in transmission input speed due to the initiation of torque transmission through said torque establishing device;

developing an actual time indication in relation to the detected occurrence of input speed change and a reference time indication in relation to the time at which an input speed change would be expected to occur during normal operation;

comparing the actual time indication to the reference time indication in order to detect the occurrence of overfill or underfill conditions; and

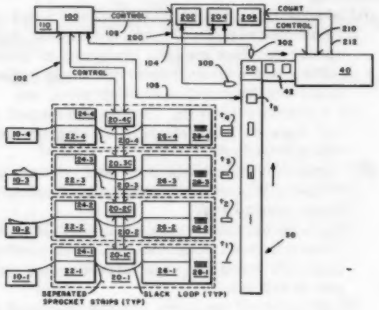
adjusting said predetermined time in accordance with said comparison so as to increase the predetermined time when an underfill condition is detected, and decrease the predetermined time when an overfill condition is detected, thereby to improve the shift quality in subsequent shifts to said specified speed ratio.

4,707,790

CONTROL SIGNAL BUFFER FOR USE IN AN INSERTER SYSTEM

John M. Gomes, Huntington, and Charles F. Gilson, Sandy Hook, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Nov. 21, 1985, Ser. No. 800,232
Int. Cl.[4] G06F *15/46*; B65H *39/02*
U.S. Cl. 364—478 **10 Claims**



1. An inserter system comprising:

a. a web means for assembling batches of forms, said forms including a control document in each of said batches, and for generating control signals associated with each of said batches in accordance with information imprinted on said control document;

b. sheet inserter means responsive to said control signals for adding sheets to said batches of forms in accordance with said control signals;

c. transfer means intermediate said web means and said sheet inserter means for transferring said batches from said web means to said sheet inserter means;

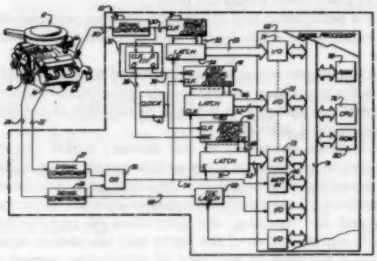
d. detector means for detecting the transfer of said batches to said transfer means and for generating an output signal indicative of successful transfer; and,

e. buffer means responsive to said detector means for receiving said control signals when transfer of said associated batch begins and transmitting said control signals to said sheet inserter if, and only if, said transfer is successfully completed.

4,707,791
ON-BOARD MOTOR VEHICLE TIMING MEASUREMENT SYSTEM

Michael W. Hmelovsky, Windsor, and Rinaldo R. Tedeschi, Newington, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Feb. 1, 1985, Ser. No. 697,597
Int. Cl.[4] F02P 5/04
U.S. Cl. 364—431.04 2 Claims



1. Apparatus for measuring the timing angle of an internal combustion (IC) engine having a crankshaft mounted ring gear with a plurality of ring gear teeth spaced at substantially equal circumferential intervals, a top dead center (TDC) timing marker, and ignition apparatus, in a system having engine mounted sensors for providing engine sensed signals in each engine cycle, including: a ring gear signal having a series of tooth pulses marking the tooth intervals between passage of successive ring gear teeth past a fixed point in the engine, a TDC signal indicative of the occurrence of TDC in a selected engine cylinder, and an ignition signal indicative of the occurrence of combustion in the selected engine cylinder, the apparatus comprising:

timing means, for providing a series of clock pulses;

first counter means, for counting the number of ring gear signal tooth pulses occurring in each engine cycle, to provide a whole number tooth interval count signal indicative of the whole number of ring gear tooth intervals in each engine cycle;

first signal means, responsive to the pulsed ring gear signal, for providing oppositely polled, first and second bistable signals, each said bistable signal alternating between first and second signal states at each succeeding tooth interval of said ring gear signal, wherein said first and second bistable signals are in opposite ones of said first and second signal states at any time;

second and third counter means, each responsive to said timing means and to a related one of said first and second bistable signals, for accumulating the number of said clock pulses occurring in the presence of each said first signal state of the related bistable signal, said second and third counter means each storing therein for the duration of said next succeeding second signal state a sum clock count signal value obtained for each first signal state whereby one of said second and third counter means includes, at any time, a stored sum clock count signal value for an immediately preceeding tooth interval and another one thereof includes an accumulating clock count signal value for a present tooth interval;

signal processing means, having memory means for storing signals, and responsive to said engine sensed signal, for

sampling said whole number tooth interval count signal value, said sum clock count signal value and said accumulating clock count signal value, to provide a sample value set, at the occurrence of TDC and at the occurrence of combustion in the selected cylinder in each engine cycle;

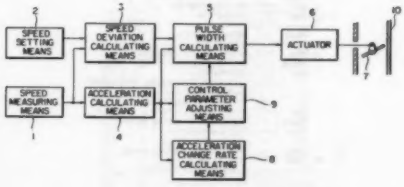
calculating a decimal number tooth interval value for each sample set as equal to the ratio of said accumulating clock count signal sampled value divided by said sum clock count signal sampled value and adding said calculated decimal number value to the sampled whole number tooth interval count signal to provide a total tooth interval signal for each sample set; and

providing the difference value between said total tooth interval signals for each sample set as the engine timing signal.

4,707,792
AUTOMOBILE SPEED CONTROL SYSTEM

Yasuo Naitou, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Oct. 4, 1985, Ser. No. 784,092
Claims priority, application Japan, Oct. 8, 1984, 59-211881
Int. Cl.[4] B60K 31/00
U.S. Cl. 364—431.07 8 Claims



1. An automobile speed control system comprising:

a running speed measuring means (1) for measuring the running speed of said automobile;

a speed setting means (2) for setting a desired speed;

a speed deviation calculating means (3) for receiving the set speed signal from said speed setting means and the running speed signal from said speed measuring means to calculate a speed deviation;

an acceleration calculating means (4) for calculating the acceleration of said automobile in response to the running speed signal from said speed measuring means;

a pulse width calculating means (5) for calculating the pulse width of a pulse signal having a fixed period of time on the basis of the speed deviation signal from said speed deviation calculating means and the acceleration signal from said acceleration calculating means;

an actuator (6) for receiving the pulse signal from said pulse width calculating means to control the opening of a throttle valve (7) of an engine according to the pulse width of said pulse signal;

an acceleration change rate calculating means (8) for receiving an acceleration signal from said acceleration calculating means to calculate the rate of change of the acceleration of said automobile; and

a control parameter adjusting means (9) for receiving the acceleration signal from said acceleration calculating means and the acceleration change rate signal from said acceleration change rate calculating means to adjust the control parameter of said pulse width calculating means.

4,707,793
METHOD OF DETERMINING FEED RATE AND CUTTING SPEED FOR CUTTING METAL AND OF PREDICTING CUTTING EFFECTS

David A. Anderson, Sumner, Wash., assignor to The Boeing Company, Seattle, Wash.

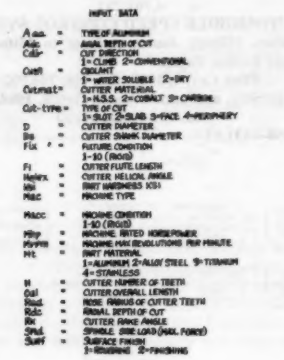
Filed Sep. 30, 1985, Ser. No. 782,270
Int. Cl.[4] G06F 15/46; G05B 13/00
U.S. Cl. 364—474 32 Claims

1. In a system having a machine with a cutter for cutting a metal workpiece and a fixture for mounting the workpiece, a method of adjusting the feed rate and cutting speed for a machining operation to the characteristics of the material to be

cut, the cut to be made, the fixture, the cutter, and the machine, said method comprising:

determining a first set of parameters, including a preliminary cutting speed and a preliminary feed rate, from the characteristics of the material to be cut, the cut to be made, the fixture, the cutter, and the machine;

calculating the maximum allowable cutter force from the first set of parameters;


INPUT DATA
Acc. = TYPE OF ALUMINUM
Adc. = AXIAL DEPTH OF CUT
Cdir = CUT DIRECTION
1=CLIMB 2=CONVENTIONAL
Cutfl = COOLANT
1= WATER SOLUBLE 2=DRY
Cutmat = CUTTER MATERIAL
1=H.S.S. 2=COBALT 3=CARBIDE
Cut-type = TYPE OF CUT
1=SLOT 2=SLAB 3=FACE 4=PERIPHERY
D = CUTTER DIAMETER
Ds = CUTTER SHANK DIAMETER
Fix = FIXTURE CONDITION
1-10 (RIGID)
Fl = CUTTER FLUTE LENGTH
Helrx = CUTTER HELICAL ANGLE
Hbi = PART HARDNESS (KSI)
Mac = MACHINE TYPE
Macc = MACHINE CONDITION
1-10 (RIGID)
Mhp = MACHINE RATED HORSEPOWER
Mxrpm = MACHINE MAX REVOLUTIONS PER MINUTE
Mt = PART MATERIAL
1=ALUMINUM 2=ALLOY STEEL 3=TITANIUM
4=STAINLESS
N = CUTTER NUMBER OF TEETH
Oal = CUTTER OVERALL LENGTH
Rad = NOSE RADIUS OF CUTTER TEETH
Rdc = RADIAL DEPTH OF CUT
Rk = CUTTER RAKE ANGLE
Shd = SPINDLE SIDE LOAD (AXIAL FORCE)
Surf = SURFACE FINISH
1=ROUGHING 2=FINISHING

calculating a base cutting speed from the first set of parameters;

calculating the maximum feed rate from the first set of parameters, the maximum allowable cutter force, and the base cutting speed; and

designating the calculated base cutting speed as the initial cutting speed, and the calculated maximum feed rate as the initial feed rate, for the machining operation.

4,707,794

PLAYBACK OPERATION CIRCUIT IN SYNTHETIC-SPEECH CALCULATOR

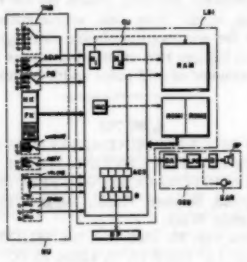
Shintaro Hashimoto, Ikoma; Sigeaki Masuzawa, Nara; Hisao Kunita, Yamatokoriyama; Tomohiro Inoue, Nara, and Kosuke Nishimura, Yamatokoriyama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 130,055, Mar. 13, 1980, abandoned. This application Mar. 1, 1982, Ser. No. 353,092

Claims priority, application Japan, Mar. 13, 1979, 54-29487; Mar. 16, 1979, 54-32156

Int. Cl.[4] G10L *5/00*

U.S. Cl. 364—513.5 **7 Claims**



1. A synthetic-speech calculator capable of developing audible sounds representative of a calculation being performed by said calculator, said calculator being in an initial condition prior to performing said calculation, said calculation utilizing a calculation equation as a function of at least one unit of calculation numerical data, comprising:

input means for introducing said calculation equation and said unit of calculation numerical data into said synthetic-speech calculator;

memory means connected to the input means for storing said calculation equation and said unit of calculation numerical data therein;

display means connected to said memory means for generating a visual display of said calculation equation and of said unit of calculation numerical data;

means for performing said calculation utilizing said calculation equation as a function of said calculation numerical data;

audible sound generating means connected to said memory means for generating audible sounds representative of said calculation equation as a function of said unit of calculation numerical data; and

playback means connected to said memory means and responsive to actuation of a key switch on said input means for repeating said calculation utilizing said calculation equation as a function of said unit of calculation numerical data and for repeating the generation of said audible sounds representative of the entire said calculation equation as a function of said unit of calculation numerical data;

wherein the display means further comprises means for indicating the number of calculation equations presently executing the calculation.

4,707,795

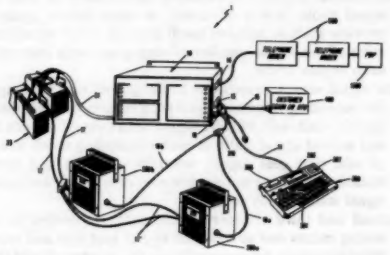
BATTERY TESTING AND MONITORING SYSTEM

Carl H. Alber, and Glenn Alber, both of Boca Raton, Fla., assignors to Alber Engineering, Inc., Boca Raton, Fla.

Continuation-in-part of Ser. No. 475,321, Mar. 14, 1983, abandoned. This application Jun. 20, 1985, Ser. No. 746,754

Int. Cl.[4] G01N *27/46*

U.S. Cl. 364—550 **10 Claims**



1. A programmable battery testing and monitoring system comprising:

(a) a monitor means connectable to battery means and including:

(i) computer means;

(ii) memory means connected to said computer means and including hard preprogrammable storage means and temporary storage means; and

(iii) port means;

(b) control means connectable to said port means for enabling a user to program said memory means and retrieve data indicative of monitoring and testing of said battery means from said temporary storage means;

(c) load means connectable between said monitor means and said battery means for controllably placing a load on said battery means, said load means comprising a first fixed load momentarily placeable across said battery means to test the output voltage of said battery means under said fixed load and a second variable load controllable by said

load means for testing said battery means under substantially constant current, said second variable load being varied responsive to sensing by said load means of current outputed by said battery to maintain constant battey means current level;

(d) said system having a monitoring mode wherein said battery is substantially continuously monitored and a testing mode wherein said load means is connected between said monitor means and said battery means; and

(e) fuse means incorporated into said first fixed load for opening connection between said first fixed load and said battery means after a predetermined time.

4,707,796

RELIABILITY AND MAINTAINABILITY INDICATOR

Salvatore R. Calabro, 76 Earway Ave., Bellville, N.J. 07109; John A. Calabro, 101-14 Ascan Ave., Forest Hills, N.Y. 11375, and Chun Hsu, 4811 Bradford Blvd., Huntsville, Ala. 35805

Continuation of Ser. No. 542,452, Oct. 19, 1983, abandoned. This application Aug. 13, 1986, Ser. No. 894,759

Int. Cl.[4] G01M *15/00*; G06F *15/16*

U.S. Cl. 364—552 **12 Claims**

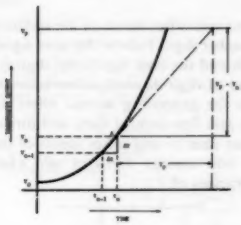


FIGURE 1 TYPICAL PARAMETER DEGRADATION

1. A method for predicting the time remaining for individual equipment to fail, comprising the steps of:

(1) sampling at predetermined times the output signal of at least one transducer monitoring at least one key operating parameter of said equipment;

(2) computing at given sampling times the slope of the curve formed by said output signal versus time;

(3) extrapolating from said slope the remaining time for said operating parameter to cause said output signal to increase to a known amplitude representative of a failure condition for said equipment, the extrapolated time being indicative of the remaining time to failure; and

(4) successively repeating steps (2) and (3) as said curve is generated, whereby said extrapolated time continues to reflect the slope of the said curve as said slope changes.

8. A system for providing an early warning indicator of impending equipment failure for an individual one out of a population of similar equipment, without requiring statistical analysis of the failure modes of populations of similar equipment, the improvement comprising:

at least one transducer means connected to said equipment, for providing an output signal having a magnitude analogous to the operating condition of at least one key parameter of said equipment;

sampling means for sampling said output signal at predetermined times;

computing means receptive of the sampled portions of said output signal, for computing the slope of the curve formed by said output signal versus time at predetermined sampling times;

extrapolation means for computing from the slope of said curve at a given sampling time, the expected time, T_F remaining for the level of said output signal to reach a predetermined level where said equipment is expected to fail or degrade in performance; and

means for successively recomputing the said slope of the output signal versus time curve as said curve is generated, whereby said extrapolated expected time T_F reflects the slope of the said curve as said slope changes.

4,707,797

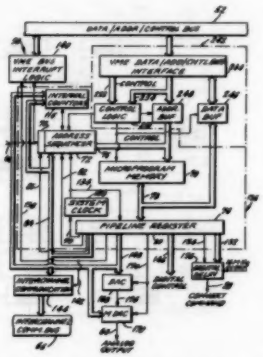
FUNCTION GENERATOR FOR NMR SYSTEM

Randal L. Briggs, Billerica, Mass., assignor to Advanced NMR Systems, Inc., Woburn, Mass.

Filed Mar. 20, 1985, Ser. No. 713,785

Int. Cl.[4] G06F *15/31*; G06J *1/00*

U.S. Cl. 364—607 **41 Claims**



1. A waveform synthesizer for generating at least one analog waveform and a plurality of digital outputs for an NMR imaging system, said synthesizer unit comprising:

(a) address sequencer means for producing a sequence of dynamically modifiable addresses;

(b) a programmable memory for storing therein digital and control information in the form of data words, each of the data words including a plurality of data fields, the programmable memory being responsive to said addresses to output said data words;

(c) a pipeline register coupled to said memory and having a capacity to hold at least one of said data words, said address sequencer means being coupled to said pipeline register and receiving therefrom an instruction field which defines an operation to be performed by said address sequencer means and digital output fields which define the state of said digital outputs, said addresses produced by said address sequencer means being developed in accordance with said instruction field from said pipeline register;

(d) means for producing said analog waveform, said means being coupled to said pipeline register and being responsive to an analog data field of said pipeline register to produce said analog waveform;

(e) means for receiving data from a source external to said synthesizer and entering said data into said programmable memory, whereby the waveshape of said analog waveform and digital output may be altered;

(f) means for receiving external input signals for dynamically modifying synthesizer activities in accordance with external events;

(g) a system clock generating means for producing a clock signal which determines the frequency at which said addresses are generated, said system clock means including means for producing a first clock output having clock pulses of a predetermined frequency, at least said address sequencer means and said pipeline register being coupled

to said clock signal and being synchronized to said clock signal; and

(h) at least one interval timer counter for timing events of said synthesizer for producing time delays.

4,707,798

METHOD AND APPARATUS FOR DIVISION USING INTERPOLATION APPROXIMATION

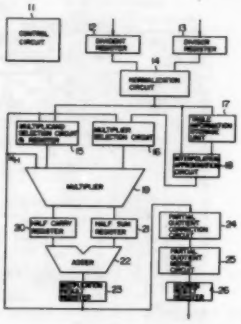
Hiraku Nakano, Hadano, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 31, 1984, Ser. No. 687,912

Claims priority, application Japan, Dec. 30, 1983, 58-247646

Int. Cl.[4] G06F 7/52

U.S. Cl. 364—765 **8 Claims**



1. A divide apparatus comprising:

normalizing means for normalizing a divisor and a dividend;

table means for storing a plurality of approximate reciprocal divisors, said table means further storing differences, corresponding to respective ones of said approximate reciprocal divisors, between said respective ones and adjacent others of said approximate reciprocal divisor, and outputting said approximate reciprocal divisor difference by using the high-order bits of the normalized divisor from said normalizing means as an address of said table means;

interpolation approximation circuit means for outputting an approximate reciprocal divisor obtained through interpolation approximation in accordance with said approximate reciprocal divisor and difference from said table means and a plurality of bits following said high-order bits of the normalized divisor as the address of said table means; and

multiplier means input with said normalized divisor and dividend and the interpolation approximated approximate reciprocal divisor from said interpolation approximation circuit means for outputting a quotient through multiplication.

4,707,799

BIT SLICED DECIMAL ADDING/SUBTRACTING UNIT FOR MULTI-DIGIT DECIMAL ADDITION AND SUBTRACTION

Tadashi Ishikawa, and Kazutoshi Eguchi, both of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 28, 1985, Ser. No. 695,346

Claims priority, application Japan, Jan. 30, 1984, 59-14708; Jan. 30, 1984, 59-14709

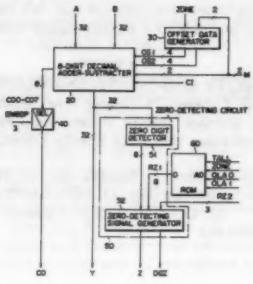
Int. Cl.[4] G06F 7/50

U.S. Cl. 364—771 **5 Claims**

1. A bit sliced decimal adding/subtracting unit comprising:

an n-digit decimal adder/subtracter including n1-digit decimal adder/subtracters (n is an even number) with offset inputs, which are intercoupled so as to allow a carry to propagate from the lower order digit to the higher order digit;

first means for generating first offset data in accordance with first control data for specifying an operation mode of said n-digit decimal adder/subtracter, and with second control data indicating whether the data format of the data to be operated by said n-digit decimal adder/subtracter is of the pack format or of the zone format, and for supplying said



offset data to said offset inputs of the adder/subtracters at the even number digits (where the most significant digit is the 0th digit and the least significant digit is the (n−1)th digit) of said n1-digit decimal adder/subtracters of; and

second means for generating second offset data in accordance with said first control data, and for supplying said second offset data to said offset inputs of the adder/subtracters at odd number digits of said n1-digit decimal adder/subtracters of.

4,707,800

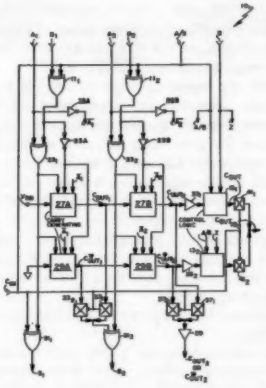
ADDER/SUBSTRACTOR FOR VARIABLE LENGTH NUMBERS

Dale L. Montrone, Londonderry, N.H., and Edward T. Lewis, Sudbury, Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Mar. 4, 1985, Ser. No. 708,185

Int. Cl.[4] G05F 7/50; G06F 7/38

U.S. Cl. 364—788 **2 Claims**



1. In a multi-bit adder wherein digital numbers, each having N bits, where N is an even number greater than four, may be added in connected stages so that appropriate carry signals

may be propagated from stage to stage, the improvement comprising:

(a) first control circuitry, responsive to a first signal having either a logic one or a logic zero level, for electrically separating selected ones of the connected stages to allow digital numbers, each having less than N bits, to be processed simultaneously; and

(b) second control circuitry, responsive to a second signal having either a logic one or logic zero level, for converting one of the numbers applied to each one of the connected stages to its "two's complement" so that the result of addition in each one of the connected stages is the subtraction of one of the applied numbers from the other numbers.

4,707,801

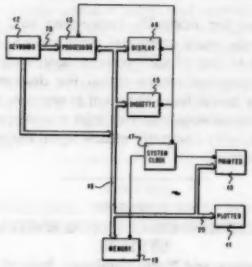
WORD PROCESSING SYSTEM BASED ON A DATA STREAM HAVING INTEGRATED ALPHANUMERIC AND GRAPHIC DATA

Johnny G. Barnes, Austin; James N. Chen, Round Rock, and Gerald E. Hayes, Austin, all of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 493,403, May 11, 1983. This application Aug. 8, 1986, Ser. No. 894,099

Int. Cl.[4] G06F *3/00*

U.S. Cl. 364—900 **6 Claims**



1. A word processing system comprising:

interactive display terminal means for receiving data representative of alphanumeric characters and data representative of graphics, and for displaying alphanumeric characters and graphic information;

means for integrating said alphanumeric character data and said graphic data from said terminal means into a data stream;

a character generator, connected to the data stream and responsive to the alphanumeric character data, for generating said alphanumeric characters for display on said terminal means from said data representative of alphanumeric characters from said data stream;

means, connected to the data stream and responsive to the graphic data, for converting said data representative of graphics from said data stream into graphic characters and for providing said graphic characters to said character generator to display said characters on said terminal means;

means, connected to the data stream and responsive to the alphanumeric character data and the graphic data, for selectively applying the data in said data stream representative of said alphanumeric characters to a printing means, and for selectively applying the data in said data stream representative of said graphics to an illustrating means;

said printing means, responsive to the selectively applying means, for printing said alphanumeric characters on a document from said data representative of alphanumeric characters; and

said illustrating means, responsive to the selectively applying means, for producing graphic information on said document from said data representative of said graphics in a format different from said graphic characters or said alphanumeric characters.

4,707,802

SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE SELECTED BY AN ADDRESS SIGNAL

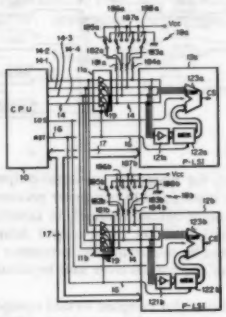
Hitoshi Takahashi, Tokyo, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Sep. 20, 1983, Ser. No. 534,135

Claims priority, application Japan, Sep. 30, 1982, 57-169542

Int. Cl.[4] G06F *12/02*

U.S. Cl. 364—900 **12 Claims**



8. A semiconductor integrated circuit device in a data processing system including a bus line and a central processing unit, operatively connected to the bus line generating a chip address signal, a reset and a bus switching signal, said semiconductor integrated circuit device comprising:

a bus buffer, operatively connected to the bus line, having an on/off terminal;

address data means, connected to said bus buffer, for generating chip address data during an initial setting mode;

a signal line connected to said bus buffer and said address data means;

an address memory, connected to said signal line, for storing the chip address data, received via the signal line, as a chip address of said semiconductor integrated circuit device;

a comparator, connected to said signal line and said address memory, for comparing the chip address data from said address memory with the chip address signal from the central processing unit, receiving via the bus line, said bus buffer and said signal line, and for generating a coincidence signal indicating one of coincidence and non-coincidence of the chip address signal and the chip address data;

a first inverter, connected to said comparator, for inverting the coincidence signal;

a second inverter connected to the central processing unit to receive and invert the bus switching signal;

a flip-flop connected to said first and second inverters;

an AND gate, having inputs connected to said flip-flop and the central processing unit to receive the bus switching signal, and having an output, for generating a buffer signal which turns on said bus buffer when the coincidence signal indicates coincidence between the chip address signal and the chip address and turning off the bus buffer when the bus switching signal changes; and

an OR gate, having inputs connected to the output of said AND gate and the central processing unit to receive the reset signal and an output operatively connected to the on/off terminal of said bus buffer, for ORing the reset signal and the buffer signal.

4,707,803

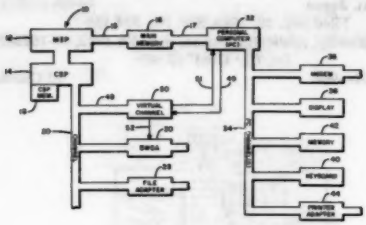
EMULATOR FOR COMPUTER SYSTEM INPUT-OUTPUT ADAPTERS

Bruce O. Anthony, Jr.; Thomas M. Heise, and Frank P. Sheppard, all of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 17, 1985, Ser. No. 745,728

Int. Cl.[4] G06F *13/00, 13/24*

U.S. Cl. 364—900 **11 Claims**



1. An apparatus for emulating an input-output adapter, for connection to an interruptable computer processor, and computer processor input-output channel, in combination with a plurality of special function input-output adapters, each of which are activated by said computer processor issuing predetermined selection commands over said input-output channel, comprising

(a) a command decoder coupled to said computer processor input-output channel, including means for identifying at least one of said predetermined selection commands of at least a first special function input-output adapter, and for generating a first signal upon identifying said first special function input-output adapter selection command;

(b) an interrupt control circuit connected to receive said first signal, having means for interrupting said computer processor upon receipt thereof, and having means for generating a further interrupt signal, and having means for generating an enable signal;

(c) an enable circuit coupled to said first special function input-output adapter, and connected to said interrupt control circuit to receive said enable signal, said enable circuit having means for blocking said first special function input-output adapter selection command unless said enable signal is received;

(d) an auxiliary processor coupled to said computer processor and connected to receive said interrupt control circuit further interrupt; and

(e) means in said computer processor for receiving said interrupt control circuit computer processor interrupt, including means for executing an interrupt processing software routine having therein a programmable selection criteria for emulating an input-output adapter and for determining whether said first special function input-output adapter is to be selected or whether an input-output adapter is to be emulated, and means for transmitting a further command to said command decoder to either unblock said first special function input-output adapter or to generate said further interrupt signal to said auxiliary processor, to cause said auxiliary processor to emulate an input-output adapter.

4,707,804

COMPUTER SECURITY SYSTEM

Luis T. Leal, 938 Noble Pl., Toledo, Ohio 43608

Filed Feb. 21, 1984, Ser. No. 581,894

Int. Cl.[4] H04Q *1/00*

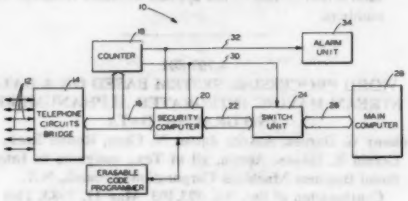
U.S. Cl. 340—825.32 **7 Claims**

7. In a computer system having a plurality of remote terminals adapted to communicate with a main computer over respective information transmission paths, a security system for preventing an unauthorized user from gaining access to the main computer via one of the remote terminals utilizing an unauthorized access code comprising:

first bus means connected to the plurality of information transmission paths;

counter means connected to said first bus means for generating a signal when the number of information transmission paths being utilized by remote users exceeds a predetermined maximum number;

security computer means connected to said first bus means and responsive to information carried thereon for generating a signal when an unauthorized access code is provided by a remote user;



second bus means connected to said security computer means;

switch means for normally connecting said second bus means to the main computer, said switch means being responsive to one of said counter means signal and said security computer means signal for disconnecting said second bus means from the main computer; and

alarm unit means responsive to said counter means signal and said security computer means signal for generating an alarm indication.

4,707,805

DATA PROCESSING CIRCUIT FOR DIGITAL AUDIO SYSTEM

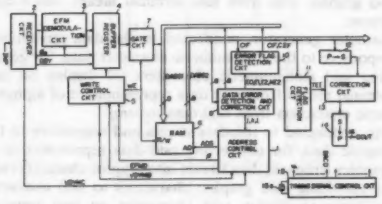
Sadayuki Narusawa, and Norio Tomisawa, both of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Shizuoka, Japan

Filed Oct. 3, 1984, Ser. No. 657,487

Claims priority, application Japan, Oct. 5, 1983, 58-186104; Nov. 26, 1983, 58-222998; Nov. 26, 1983, 58-222999

Int. Cl.[4] G06F *13/00, 3/00*; G11B *7/00*

U.S. Cl. 364—900 **9 Claims**



1. A data processing circuit for a digital audio system in which symbol data read from a recording means are once stored in a symbol memory at specified data addresses so that data errors included in the stored symbol data are detected and corrected, the symbol data contained in the symbol memory after the detection and correction being read from the symbol memory for conversion into analog signals, said data processing circuit comprising:

means for generating a reference address data indicative of a data address of symbols stored in said symbol memory;

means for generating a relative address data indicative of a data address of symbols stored in said symbol memory relative to the reference address data;

first adder means for adding said relative address data to said reference address data to form an absolute address data indicative of a data address of said symbol memory, said absolute address data being supplied to said symbol memory to address the absolute address of said symbol memory so that a symbol data in said absolute address is processed;

means for generating an internal clock pulse;

first signal generating means responsive to said internal clock pulses for generating an internal frame synchronization signal representative of the transition from one data processing period of a frame of said stored symbol data to the data processing period following said one data processing period; and

second signal generating means for discriminating a frame synchronization pattern from said symbol data read from the recording means to output an EFM frame synchronization signal;

said reference address data generating means comprising (a) first counter means for counting said internal frame synchronization signals, (b) second counter means for counting said internal frame synchronization signals in one of upward and downward directions and for counting said EFM frame synchronization signals in the other of upward and downward directions, and (c) second adder means for adding both outputs of said first and second counter means together when said symbol data read from said recording means are being stored in said symbol memory, said second adder means outputting the output of said first counter means when said symbol data read from said recording means are not being stored in said symbol memory, an output of said second adder means being supplied to said first adder means as said reference address data.

4,707,806

SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE HAVING FUSE-TYPE INFORMATION STORING CIRCUIT

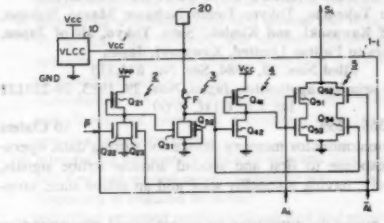
Yoshihiro Takemae, Tokyo; Tomio Nakano, Kawasaki; Takeo Tatematsu, Yokohama; Junji Ogawa, Tokyo; Takashi Horii, Kawasaki; Yasuhiro Fujii, Yokohama; Masao Nakano, Kawasaki, all of Japan, and Norihisa Tsuge, deceased, late of Kamakura, Japan by Itaru Tsuge, Sachie Tsuge, heirs, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Mar. 15, 1985, Ser. No. 712,149

Claims priority, application Japan, Mar. 23, 1984, 59-055501

Int. Cl.⁴ G11C *11/00*

U.S. Cl. 365—96 **15 Claims**



1. A semiconductor integrated circuit device connected between first and second voltage feed means, comprising:

information storing means including a fuse for storing information by blowing or not blowing said fuse and for providing a corresponding output depending on whether or not said fuse has been blown;

a voltage level conversion means, coupled to at least one of the first and second voltage feed means, for outputting a voltage to said information storing means that lies between the voltages of said first and second voltage feed means;

detection means, coupled to said information storing means, for outputting a detection signal in response to said output of said information storing means.

4,707,807

NON-VOLATILE, PROGRAMMABLE, STATIC MEMORY CELL

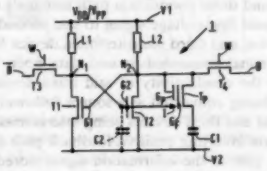
Roger Cuppens, and Cornelis D. Hartgring, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 9, 1985, Ser. No. 806,313

Claims priority, application Netherlands, Jun. 6, 1985, 8501631

Int. Cl.⁴ G11C *11/00*

U.S. Cl. 365—154 **5 Claims**



1. A non-volatile programmable static memory cell including first and second insulated gate transistors each with a source, a drain and a gate, the gate of each transistor being connected to the drain of the other, a first supply terminal, a separate load connected between each drain and said first supply terminal, a second supply terminal, the sources of said first and second transistors being connected to said second supply terminal, a capacitor and a programmable transistor with a channel, said capacitance and said channel being connected in series between the gate of said first transistor and said second supply terminal, said programmable transistor including a source, a drain, a control gate, a floating electrode and a charge injection location opposite said floating electrode, said control gate and said drain of said programmable transistor being connected to the gate of said first transistor, said charge injection location being connected to the gate of said second transistor.

4,707,808

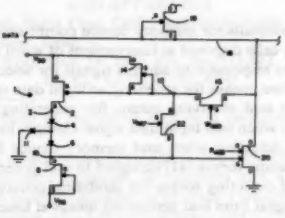
SMALL SIZE, HIGH SPEED GaAs DATA LATCH

Gary L. Heimbigner, Anaheim, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Apr. 26, 1985, Ser. No. 727,958

Int. Cl.⁴ G11C *7/00*

U.S. Cl. 365—182 **2 Claims**



1. A GaAs data latch memory cell having a data node at

which binary information is stored, said memory cell comprising:

a source of binary information input signal;

a first multi-terminal depletion MESFET device having source and drain conduction path terminals connected to apply a binary information input signal from said source of binary information input signals to said data node, said first multi-terminal device having a control terminal connected to receive an address signal by which to selectively control the conductivity of said first device,

a source for a first voltage signal,

a second multi-terminal depletion MESFET device of the common gate type having source and drain conduction path terminals connected to apply said first voltage signal to said data node for preserving the level of the binary state of the information signal stored at said data node for static operation, said second multi-terminal device having a control terminal connected to receive a fixed reference voltage control signal, and

a third multi-terminal depletion MESFET device having source and drain conduction path terminals connected to supply said first voltage signal to said second multi-terminal device, said third multi-terminal device having a control terminal connected to said data node by which to control the conductivity of said third device, said third device being connected as a source follower,

said second and third devices being interconnected to establish a non-inverting positive feedback path for providing voltage gain to the information signal stored at said data node for bistable operation.

4,707,809

SEMICONDUCTOR MEMORY DEVICE WITH SHORTENED TIME PERIOD OF WORD LINE SELECTION

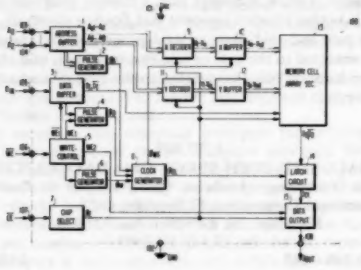
Masabu Ando, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jul. 12, 1985, Ser. No. 754,103

Claims priority, application Japan, Jul. 12, 1984, 59-144684

Int. Cl.[4] G11C *7/00*

U.S. Cl. 365—189 **11 Claims**



1. A semiconductor memory device comprising a plurality of memory cells disposed at intersections of word lines and bit lines, means responsive to address signals for selecting at least one word line, means for receiving an input data signal, means coupled to said receiving means for generating a one-shot signal (ϕ_D) when said input data signal changes its logic level, means for detecting when said memory device is in a data-write operation, means (**417**) coupled to said generating means and to said detecting means for inhibiting generation of said one-shot signal from said generating means at times other than when said detecting means detects that said memory device is in a data-write operation, means responsive to said one-shot signal for energizing the selected word line, and means for writing said input data signal into the memory cell which is accessed by the energized word line.

4,707,810

INTEGRATED CIRCUIT MEMORY

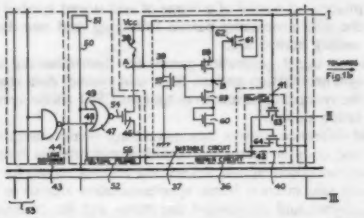
Richard Ferrant, Aix en Provence, France, assignor to Eurotechnique, Rousset, France

Filed Jan. 13, 1986, Ser. No. 818,031

Claims priority, application France, Jan. 15, 1985, 85 00525

Int. Cl.[4] G11C *7/00*

U.S. Cl. 365—200 **6 Claims**



1. An integrated circuit memory comprising:

a plurality of memory cells distributed in lines and columns in a matrix;

at least one decoder wherein the output of said at least one decoder is utilized for selecting cell lines;

at least one repair circuit interconnected between, on one side, the cell lines and at least two repair connections and, on the other side, outputs of the said at least one decoder, each of said at least one repair circuit having a fuse and being capable of switching, depending on the state of the fuse, connections between the decoder and two lines into connections between the decoder and said two repair connections;

at least two additional cell lines each of said cell lines being connected to each of said at least two repair connections; and,

wherein each of said at least one repair circuit comprises means for switching connections between two adjacent cell lines and said decoder into two connections between said decoder and said at least two repair connections.

4,707,811

SEMICONDUCTOR MEMORY DEVICE HAVING EXTENDED PERIOD FOR OUTPUTTING DATA

Yoshihiro Takemae, Tokyo; Tomio Nakano; Masao Nakano, both of Kawasaki, and Kimiaki Sato, Tokyo, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Nov. 23, 1984, Ser. No. 674,313

Claims priority, application Japan, Nov. 29, 1983, 58-223121

Int. Cl.[4] G11C *8/00*

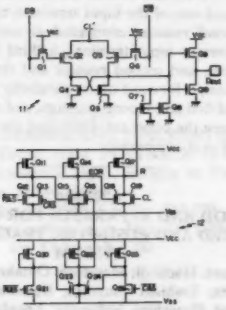
U.S. Cl. 365—239 **10 Claims**

1. A semiconductor memory device for storing data, operative in response to first and second address strobe signals, respectively, having a standby state and an active state, comprising:

output means for outputting an output signal corresponding to data stored in the memory device in response to a switchover of the first and second address strobe signals from the standby state to the active state, said output means capable of retaining the output signal; and

resetting means, operatively connected to said output means, for resetting the output signal retained by said output means in response to the switchover of the second address strobe signal from the standby state to the active state

while the first address strobe signal is maintained in the active state, said resetting means also resetting the output



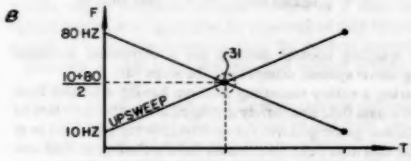
signal when both the first and second address strobe signals are in the standby state.

4,707,812

METHOD OF SUPPRESSING VIBRATION SEISMIC SIGNAL CORRELATION NOISE

David R. Martinez, Plano, Tex., assignor to Atlantic Richfield Company, Plano, Tex.

Filed Dec. 9, 1985, Ser. No. 806,442
Int. Cl.[4] G01V *1/00*
U.S. Cl. 367—46 5 Claims



1. A method of seismic prospecting in which a plurality of seismic vibrating sources at a plurality of spaced source points contemporaneously radiate seismic signals into the earth, each source being responsive to an individual reference signal, the seismic signals traveling by different paths to a plurality of receivers in forming at each receiver a respective complete recorded signal comprising the steps of:

a. generating a first signal of a first polarity and a first directional sweep over a first predetermined frequency range;

b. generating a second signal of a second and reverse polarity to said first polarity and second directional sweep opposite said first directional sweep over a second predetermined frequency range;

c. determining the common frequency of said first and second directional sweeps at a common time into their respective sweep patterns;

d. introducing alternately into first one and then the other of said first and second signals a taper at which said common frequency is reduced to zero;

e. recording returned portions of said first and second signals to form respective recorded signals;

f. separating the respective recorded signals into respective first signals and second signals to form first recorded complete signals and second recorded complete signals; and

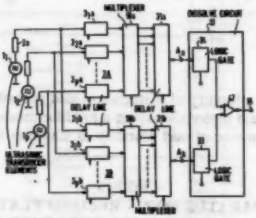
g. inverse filtering said respective said first and second recorded signals to recover information attenuated by said tapers.

4,707,813

ULTRASOUND APPARATUS PERMITTING DYNAMIC VARIATION OF THE POSITION OF THE RECEPTION FOCUS

Reiner Moeller; Gert Hetzel, both of Erlangen; Ulrich Saugeon, Nuremberg; Gustav Boheim, Zirndorf, and Viktor Zurinski, Erlangen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Nov. 12, 1986, Ser. No. 929,736
Claims priority, application Fed. Rep. of Germany, Dec. 2, 1985, 3542562; Jan. 31, 1986, 3603042
Int. Cl.[4] G01S *9/68*
U.S. Cl. 367—103 23 Claims



1. An ultrasound apparatus for generating an output signal for further processing, said apparatus comprising:

a plurality of ultrasound transducer elements for respectively generating a like plurality of received ultrasound echo signals, each transducer element having an associated reception channel;

means in each reception channel for time-delaying the ultrasound echo signal therein by a selected amount among a plurality of delays, said means consisting of two identical sub-circuits, each sub-circuit transmitting said ultrasound echo signal delayed by respectively different amounts;

a dissolve circuit for generating said output signal for the outputs of said sub-circuits, said dissolve circuit including means for alternatingly fading the respective outputs of said subcircuits into said output signal by fading the output of a first of said sub-circuits into said output signal while simultaneously blanking a second of said sub-circuits and successively fading the output of said second of said sub-circuits into said output signal while blanking said first of said sub-circuits; and

a control unit for said sub-circuits for respectively switching each of said sub-circuits to select a delay for each sub-circuit from among said plurality of delays, said control unit switching each of said sub-circuits only when that sub-circuit is blanked by said dissolve circuit for substantially eliminating disturbances in said output signal caused by switching said sub-circuits.

4,707,814

EXTENDED CAVITY LASER RECORDING METHOD AND APPARATUS

Ken Clements, Santa Cruz, Calif., assignor to Laser Dynamics, Inc., San Jose, Calif.

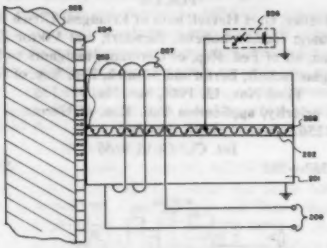
Filed Mar. 14, 1985, Ser. No. 711,842
Int. Cl.[4] G11B *11/00, 7/00*
U.S. Cl. 369—13 22 Claims

22. A method of recording data on a recording medium comprising:

providing a laser means having an active region for producing stimulated emissions of radiation and a recording medium which is essential to produce a standing wave of said radiation which extends through said active region to the surface of said recording medium;

selectively changing the wavelength of said standing wave

so as to provide a plurality of standing waves having unique wavelengths; and



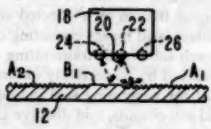
providing a plurality of materials in said recording medium, each of said materials having a predetermined response to a different one of said plurality of standing waves.

4,707,815

APPARATUS FOR A RECORD PLAYER DISTINGUISHING BETWEEN RECORDED AND UNRECORDED PORTIONS OF A DISC

Hiroshi Yamasaki, Yokohamashi, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kanagawa, Japan

Filed Aug. 25, 1980, Ser. No. 180,993
Claims priority, application Japan, Sep. 29, 1979, 54-125476
Int. Cl.[4] G11B *17/00*
U.S. Cl. 369—33 **3 Claims**



1. Apparatus, including a tone arm, for use with equipment for playing a disc, said apparatus distinguishing between recorded and unrecorded portions of the disc, comprising:

a pair of light-sensitive devices mounted on the tone arm for facing the disc, the devices being spaced across the width of the tone arm in leading the trailing positions for sensing light reflected from separate but adjacent portions of the disc, said devices individually producing an electrical signal when at least a predetermined level of reflected light is sensed;

a circuit for uniforming the potential strength of said electrical signals produced by said light-sensitive devices including a pair of transistors each having a base, a collector and an emitter, each base being connected respectively to the output terminal of the light-sensitive devices, each collector being connected to a terminal of a like power source, and each emitter being resistively connected to a like reference source terminal; and

means coupled to said light-sensitive devices through said uniforming circuit for determining the relative states of the devices as being reversed or not reversed from a predetermined relationship between the devices as to sensing or not sensing said predetermined level of light, said means comprising:

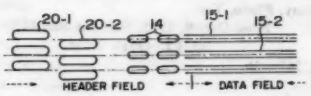
a circuit for establishing a difference between the potentials of the signals emitted by said devices through said uniforming circuit when said predetermined light level is sensed for establishing said predetermined relationship, and a comparator, said comparator having a pair of input terminals each connected to an individual one of said light-sensitive devices through said potential difference establishing circuit and said uniforming circuit, said potential difference establishing circuit including a first resistor connected between one of the transistors and one of the input terminals of said comparator, a second resistor connected at one end to said one comparator input terminal, a third resistor connected between said second resistor and the reference source terminal, a forward diode parallelly connected to both of said first and second resistors, and a direct connection between the other transistor and the other input terminal of said comparator.

4,707,816

METHOD AND APPARATUS FOR COMPOSITE WOBBLED AND PUSH-PULL TRACKING SERVO SYSTEM

Seiji Yonezawa, Hachioji; Masatoshi Ohtake, Ome; Masaru Ito, Sagamihara; Toshiaki Tsuyoshi, Kokubunji; Kazuo Ichino, Tokyo, and Harushige Nakagaki, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 845,340, Mar. 28, 1986. This application Dec. 8, 1986, Ser. No. 938,961
Claims priority, application Japan, Mar. 29, 1985, 60-63587; Jul. 5, 1985, 60-146507; Jul. 29, 1985, 60-165777; Dec. 6, 1985, 60-273228
Int. Cl.[4] G11B *7/09, 7/095*
U.S. Cl. 369—44 **13 Claims**



1. A tracking control method for a composite wobbled tracking servo system, comprising the steps of:

preparing a rotary recording medium having a header field and a data field alternately arranged along the direction of rotation, guide grooves (pregrooves) being provided in at least said data field, said header field including at least one pair of wobbled track marks disposed in a relation wobbled relative to the center of a track;

irradiating the recording surface of said recording medium with a light spot;

detecting a first tracking error signal from the reflection of said light spot diffracted by said pregroove on said recording medium;

detecting a second tracking error signal from the reflection of said light spot passing said wobbled track marks;

correcting said first tracking signal on the basis of said second tracking signal, the gain of said second tracking error signal being selected to be higher than that of said first tracking error signal in a low frequency range, high frequency components of said second tracking error signal being attenuated by low-pass filter means having a predetermined cut-off frequency so that the gain of said second tracking error signal having been passed through said low-pass filter means becomes equal to that of said first tracking error signal at a frequency fe satisfying the relation

$$1/50 \cdot N \cdot fd < fe < 1/5 \cdot N \cdot fd$$

where fd is the frequency of rotation of said recording medium, and N is the number of said header fields included in one complete revolution of said recording medium;

combining said second tracking error signal having been passed through said low-pass filter means with said first tracking error signal to provide a composite tracking error signal; and

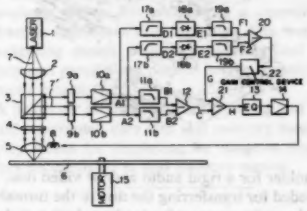
using said composite tracking error signal for the tracking control.

4,707,817

METHOD OF GENERATING TRACKING SERVO SIGNAL FOR OPTICAL DISC PLAYBACK APPARATUS

Junichi Yoshio, Tokorozawa, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Mar. 15, 1985, Ser. No. 712,179
Claims priority, application Japan, Mar. 16, 1984, 5951649
Int. Cl.[4] G11B *7/00*
U.S. Cl. 369—46 **3 Claims**



1. A method generating a tracking servo signal for a servo system which performs position control of a data read-out optical system in an apparatus for playback of data recorded on a track of a rotating recording disc, the method comprising:

directing a light beam through said optical system to fall upon said disc;

receiving upon first and second photo-electric elements light reflected from said disc as a result of said light beam, said first and second photo-electric elements being positioned such that approximately one-half of said reflected light falls upon said first and second photo-electric elements, respectively, with first and second sensing signals being thereby produced by said first and second photo-electric elements including respective high-frequency envelope components resulting from data recorded on said track;

processing said first and second sensing signals to derive respective low frequency components thereof, and subtracting one of said low-frequency components from the other to produce a first difference signal;

processing said first and second sensing signals to derive said respective high-frequency envelope components thereof, and substracting one of said high frequency envelope components from the other to derive a second difference signal;

amplifying or attenuating said second difference signal by a predetermined gain factor, to derive a modified second difference signal;

subtracting one of said first difference signal and said modified second difference signal from the other, to derive said tracking servo signal; and

applying said tracking servo signal to said servo system, for controlling said optical system to maintain a position of incidence of said light beam on said disc at a central position of said track;

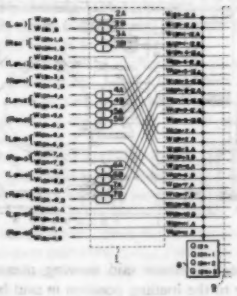
said predetermined gain factor being selected to have a value providing maximum elimination of a first DC offset component of said tracking servo signal resulting from said disc deviating from a condition of being perpendicular to said light beam.

4,707,818

METHOD AND APPARATUS FOR RECORDING DIGITIZED INFORMATION ON A DISC

Tadao Suzaki; Shoichi Nakamura, both of Tokyo; Hisao Nishioka, Kamagaya, and Yutaka Ohkubo, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

PCT No. PCT/JP84/00081, § 371 Date Oct. 23, 1984, § 102(e) Date Oct. 23, 1984, PCT Pub. No. WO84/03580, PCT Pub. Date Sep. 13, 1984
PCT Filed Mar. 2, 1984, Ser. No. 666,237
Claims priority, application Japan, Mar. 4, 1983, 58-35459
Int. Cl.[4] G11B *7/00*
U.S. Cl. 369—59 **6 Claims**



1. A method of arranging digital data including control data for subsequent recording in tracks on a rotating disc, comprising the steps of:

arranging the data and control data into a block having a predetermined number of lines each line including a predetermined number of words;

interleaving the data and control data using odd/even interleaving, where odd and even represent alternate successive lines;

generating error correction words from the interleaved data and control data; and

recording the interleaved data and control data and the error correction words on the disc in a line-by-line basis relative to said block, including the step of recording the control data twice in succession, whereby upon playback of said disc said data and control data is rearranged into said block, with said control data in two adjacent lines of said block being identical.

4,707,819

DISC DRIVING DEVICE

Takashi Ehara, 10-19, Touka-machi, Furukawa-shi, Miyagi-ken, Japan

Filed Mar. 6, 1986, Ser. No. 836,999
Claims priority, application Japan, Mar. 6, 1985, 60-30848[U]
Int. Cl.[4] G11B *23/02, 25/04*
U.S. Cl. 369—77.2 **3 Claims**

1. A disc driving device comprising:

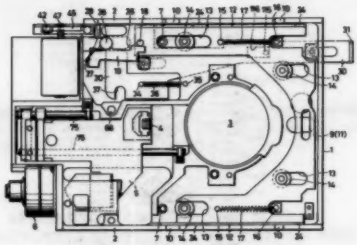
a housing having an insertion slot at a front portion thereof for insertion of a disc cartridge in a horizontal insertion direction toward a rear portion of said housing and for ejecting the cartridge toward the front portion of said housing;

a cartridge holder having an insertion passage for receiving the cartridge inserted through the insertion slot, wherein said cartridge holder is movable so as to move a fully inserted cartridge in vertical directions between an ejecting position and a loading position in said housing;

moving means for moving said cartridge holder with the cartridge fully inserted therein between the ejecting position and the loading position in the housing;

locking means for locking said moving means such that said cartridge holder is held in the ejecting position and for releasing said moving means such that said cartridge holder is moved to the loading position;

a slider having means for engaging a front end of a cartridge partially inserted to a predetermined position in the insertion passage of the cartridge holder such that the slider is displaceable with the cartridge inwardly toward a fully inserted position in the housing, said slider further having a lock release member for actuating said locking means at the fully inserted position of the cartridge in order to



automatically release said moving means to move the cartridge to the loading position in said housing; and

a spring member having one end engaged with the slider such that is moved with the slider as the cartridge is further inserted along the insertion passage, wherein the one end is moved to a position where the spring member becomes fully compressed and a direction of applied force of the spring member becomes reoriented along the insertion direction such that the applied force of the spring member is exerted on said slider engaged with the cartridge in order to automatically pull the cartridge inwardly to the fully inserted position.

4,707,820

OPTICAL FILM AND PROCESS FOR PRODUCING SAME

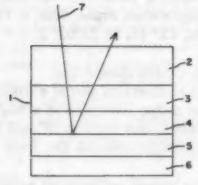
Mitsuharu Sawamura, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 17, 1984, Ser. No. 581,438

Claims priority, application Japan, Feb. 23, 1983, 58-29078

Int. Cl.[4] G11B *3/70*; G02B *1/10*

U.S. Cl. 369—284 **7 Claims**



1. An optical recording medium comprising in series a substrate, a heat insulation layer, and a recording layer, wherein an antireflection film comprising Ta_2Oin the molar ratio of Ta_2O_5 to ZrO_2 of at least one is formed either on the side of the recording layer facing the substrate or on the side of the recording layer opposite the substrate.

4,707,821

DISC HOLDER FOR A RIGID AUDIO AND/OR VIDEO DISC

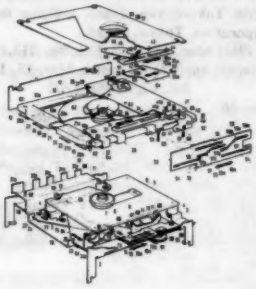
Johannes P. C. M. Verhagen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 21, 1984, Ser. No. 623,046

Claims priority, application Netherlands, Nov. 8, 1983, 8303837

Int. Cl.[4] B65D *85/02*; G11B *23/02*

U.S. Cl. 369—292 **22 Claims**



1. A disc holder for a rigid audio and/or video disc, which holder is intended for transferring the disc to the turntable of a disc-record player by means of a loading device and which comprises clamping means for retaining the disc in the disc holder, characterized in that the clamping means comprises two clamping members which are situated near respective opposite sides of the disc holder and which are each fixed relative to a respective coupling means which can be coupled to the loading device, which coupling means and clamping members are both moved away from the disc and each other to release the disc from the disc holder and towards each other and to retain the disc in said holder in response to like movements of the loading device.

4,707,822

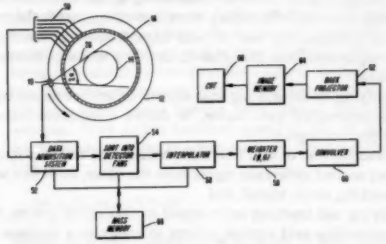
TOMOGRAPHIC APPARATUS

James F. Hopkinson, Vernon Hills, Ill., and Kyojiro Nambu, Otawara, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 9, 1985, Ser. No. 732,260

Int. Cl.[4] G06F *15/42*

U.S. Cl. 364—414 **10 Claims**



1. An apparatus for reconstructing a tomographic image of an object positioned within a scanning circle comprising:

a source of a fan-shaped beam of radiation having an angle of radiation 2a, said fan-shaped beam rotatable circumferentially about said scanning circle by an angle of π plus 2a;

radiation detection means, including a plurality of detector

elements surrounding said scanning circle, for detecting radiation in said beam passing from said source through said scanning circle as said source rotates about said scanning circle, and for producing, in response to said radiation, a source fan set of data for various positions of said source as said source rotates, each said source fan set of data representing the amount of radiation absorbed by a generally fan-shaped region of said object divergent from said source;

sort means for sorting said source fan sets of data into detector fan sets of data, each said detector fan set of data representing the amount of radiation absorbed by a generally fan-shaped region of said object divergent from a detector element of said radiation detector means, said detector fan sets of data including certain sets which have overlapping data;

weighting means for weighting said overlapping data by a smooth function which is complementary in value to said overlapped data sets;

convoluter means for performing a convolution of said detector fan sets of data including data weighted by said weighting means without reordering said detector fan data into parallel ray data to derive convoluted data;

memory means;

back projector means for back projecting and accumulating said convoluted data into said memory means; and

display means for displaying an image in response to said data accumulated in said memory means.

4,707,823

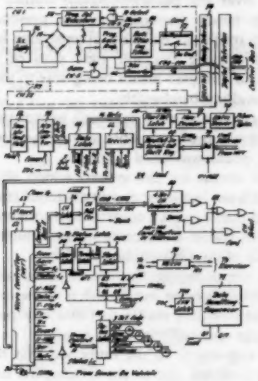
FIBER OPTIC MULTIPLEXED DATA ACQUISITION SYSTEM

Earl J. Holdren, Windsor, Canada; Alexander J. Owski, Redford, and Paul G. Fouts, Jackson, both of Mich., assignors to Chrysler Motors Corporation, Highland Park, Mich.

Filed Jul. 21, 1986, Ser. No. 887,682

Int. Cl.[4] H04B *9/00*

U.S. Cl. 370—1 **6 Claims**



1. A method of collecting and storing data from a plurality of selected rapidly changing physical phenomena in hostile environments, said collected data being stored at a location remote from the undesirable hostile environment, said method includes the steps of

(a) sensing each of said physical phenomena within the hostile environments so as to provide a plurality of electrical signals proportional to each of said physical phenomena, said signals being analog signals;

(b) conditioning each of said electrical signal by amplification within a desired voltage range;

(c) filtering each of said conditioned signal in a manner opposing the occurrences of alias signals during the collecting of said data;

(d) multiplexing each of said filtered electrical signals so as to select each one of said plurality of electrical signals as an outputer signal in a chosen sequence;

(e) sampling and holding each multiplexed signal for a duration sufficient to produce an output signal proportional to the input multiplexed signal prior to receipt of another of said multiplexed signals;

(f) converting each of said sampled signal into a digital number of a predetermined bit size;

(g) adding a predetermined number of status code bits to each of said digital number to form a digital word, said digital word providing parallel data of a chosen bit size;

(h) sequentially shifting each bit of said parallel data digital word onto a signal output line in a manner providing each of said digital words as serial data;

(i) adding a clock signal of a chosen frequency to each of said serial data words;

(j) encoding each of said serial data words and said added clock signal into a chosen code format suitable for data transmission;

(k) transmitting each of said encoded serial word and clock signal as digital light signals over a fiber optic cable to a digital receiver at a location remote from the hostile environment;

(l) at said digital receiver, converting said digital light signals transmitted over said fiber optics cable into digital electric signal representations of each of said digital word and said clock signal;

(m) decoding said digital electrical signal representation so as to reconstruct each of said serial data words and said added clock signal;

(n) sequentially shifting each bit of said serial data digital words onto parallel output lines at the reconstructed added clock signal rate to reconstruct each of said digital words;

(o) decoding each status code of each of said reconstructed word so as to provide an indication of the status of each of said words;

(p) forming an address word for each of said data word, said address word forming being in response to the status of said decoded status code associated with each of said data word;

(q) providing a memory storage computer bus system, wherein said bus system includes a master computer for said bus system, and static and dynamic memories, the location of memory space in said memories being addressable by each of said formed address;

(r) transferring control of said bus system for said bus computer to said digital receiver;

(s) writing each of said data word from said digital receiver to said bus system memories and into the memory locations corresponding to the locations designated by each of said formed address word, the writing being at a predetermined writing rate that is higher than the added clock signal rate.

4,707,824

METHOD AND APPARATUS FOR CANCELLING ECHO

Akira Kanemasa, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Dec. 10, 1984, Ser. No. 679,825

Claims priority, application Japan, Dec. 15, 1983, 58-236734; Dec. 15, 1983, 58-236736

Int. Cl.[4] H04B *3/23*

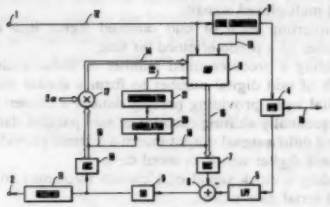
U.S. Cl. 370—32.1 **9 Claims**

1. A method for cancelling an echo by using an echo replica generated such that two sets of tap coefficients in an adaptive filter are sequentially updated, said method comprising the steps of:

calculating an error signal representing a difference between the echo replica and a reception signal;

calculating a correlation value between a signal representing a polarity of the error signal and a signal representing a polarity of the echo replica;

responsive to the correlation value being smaller than a predetermined value, selecting one set out of said two sets of tap coefficients according to a polarity of a transmission pulse, summing up the selected set of tap coefficients to



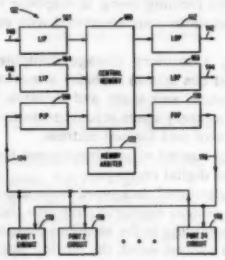
produce the echo replica, and updating the selected set of tap coefficients by using a correlation between the error signal and the polarity of the transmission pulse; and responsive to the correlation value being larger than the predetermined value, updating both of said two sets of tap coefficients irrespective of the polarity of the transmission pulse on the basis of the error signal.

4,707,825

METHODS OF INSTALLING AND ASSIGNING CONTROL PROCESSORS IN A DISTRIBUTED-CONTROL COMMUNICATIONS SYSTEM

Stanford R. Amstutz, Andover, and E. Fletcher Haselton, Waltham, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Aug. 2, 1985, Ser. No. 762,591
Int. Cl.[4] H04Q *11/04*
U.S. Cl. 370—60 **13 Claims**



1. A method of assigning a first control processor to the service set of a second control processor in a distributed-control communications system, said first control processor not being a member of said service set of sasid second control processor, said first control processor being coupled with a first port of said system, said second control processor being coupled with a second port of said system, said system having means for transmitting control bursts between said control processor and means within said system for effectuating the assignment and reassignment of control processors to service sets, said method comprising the steps of:

(a) transmitting through said system a service-set assignment message in a control burst to said first control processor, said service-set assignment message including the port address of said second control processor; and, thereafter, in accordance with said service-set assignment message,

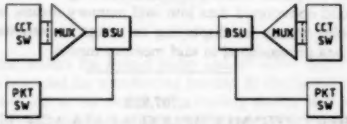
(b) modifying the operation of said first and second control processors such that said first control processor requests services from said second control processor and said second control processor provides services to said first control processor whereby said first control processor has been assigned as a member of the service set of said second control processor.

4,707,826

CIRCUIT AND PACKET DATA TRANSMISSION SYSTEM

Dennis G. Froggatt, Dunmow, United Kingdom, assignor to STC plc, London, England

Filed Jun. 27, 1985, Ser. No. 749,216
Claims priority, application United Kingdom, Jul. 17, 1984, 8418121
Int. Cl.[4] H04Q *11/04*
U.S. Cl. 370—60 **2 Claims**



1. An electrical intelligence transmission station, in which all intelligence is conveyed in digital manner and both circuit-switched traffic and packet-switched traffic are handled, which station includes:

(a) first control means for establishing priority of the circuit-switched

(b) traffic over the packet-switched traffic; time division multiplex means responsive to the presence of circuit-switched traffic to establish connections appropriate to that traffic using available time slots of the multiplex means, said miltiplex means being able to use all available traffic-handling bandwidth;

(c) buffer storage means into which packet-switched traffic is routed when all available system bandwidth is being used for circuit-switched traffic;

(d) control means for the system which allocates system bandwidth not in use for circuit-switched traffic to packet-switched traffic, which control means functions under the control of traffic monitoring means which monitors the incidence of circuit-switched traffic;

(e) means responsive to the detection by said monitoring means that all system bandwidth is in use for the handling of circuit-switched traffic to route any packet-switched traffic into said buffer storage means;

(f) means responsive to the detection that bandwidth has become available due to the termination of one or more circuit-switched connections to route any packet-switched traffic in said buffer storage means to the station's output; and

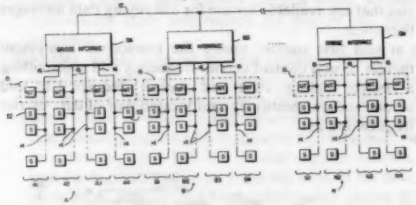
(g) common channel signalling means via which control information for the establishment of circuit-switched connections is sent from the station over its output;

the arrangement being such that the sharing of the transmission medium between the circuit-switched traffic and the packet-switched traffic is adjusted dynamically in accordance with the levels of traffic offered to the system and without interference with existing connections.

4,707,827
BRIDGING TECHNIQUES FOR LOCAL AREA NETWORKS

Angelo A. Bione, Elmhurst, and Semir Sirazi, Chicago, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

Filed Mar. 21, 1986, Ser. No. 842,518
Int. Cl.[4] H04J 3/02
U.S. Cl. 370—85 **12 Claims**

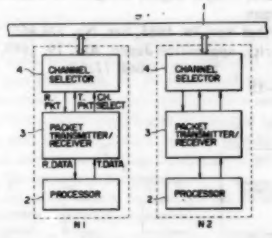


1. In a communications system:
a channel comprising a plurality of LANS including multiple stations;
bridge means associated with said channel for effecting communications between stations in different LANS of said channel;
means at each station for formatting and transmitting a data packet with a header including either a first or a second bridge signal;
each station including means responsive only to a transmitted data packet including a header having said first bridge signal; and
said bridge means including means responsive only to a transmitted data packet including a header having said second bridge signal for coupling said data packet to a selected destination station while altering said second bridge signal to said first bridge signal.

4,707,828
MULTIACCESS COMMUNICATION SYSTEM

Kunihiro Yamada, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Sep. 10, 1985, Ser. No. 774,303
Claims priority, application Japan, Sep. 11, 1984, 59-190150; Sep. 11, 1984, 59-190151; Sep. 11, 1984, 59-190152
Int. Cl.[4] H04J 3/02, 3/24
U.S. Cl. 370—85 **45 Claims**

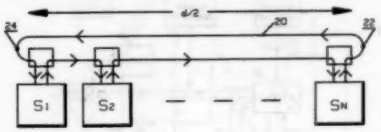


1. In a multiaccess communication method, when a data communication is to be carried out among a plurality of nodes which are connected to a common transmission path having a multichannel structure using a packet, a channel selecting means switches to a selected channel by exchanging packets for selecting a data transferring channel in advance between nodes, between which a data communication is desired, through a dedicated control channel which is allocated commonly to each of said nodes such that it establishes a reception accepting condition whenever said nodes have no session.

4,707,829
CSMA-CD WITH CHANNEL CAPTURE

Sudhir B. Pendse, Plantation, Fla., assignor to Racal Data Communications Inc., Sunrise, Fla.

Filed Sep. 25, 1986, Ser. No. 911,574
Int. Cl.[4] H04J 3/00, 3/24
U.S. Cl. 370—86 **8 Claims**

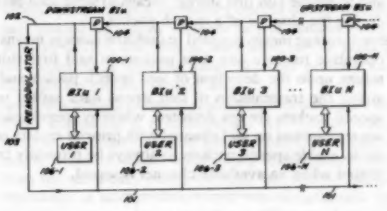


1. A method of providing access to an undirectional circular bus of electrical circumference d seconds having a plurality of stations coupled to a segment of said bus less than d/2 seconds in length, where electrical length is measured by the time required for an electrical signal to travel a predetermined distance; the method comprising:
detecting an idle bus;
transmitting a packet having a duration of at least d seconds;
ceasing transmission of said packet if a collision is detected within d/2 seconds; and
continuing transmission if a collision is detected after d/2 seconds.

4,707,830
TOKEN PASSING LAN USING A PLURALITY OF TOKENS

Mehmet E. Ulug, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 5, 1985, Ser. No. 708,452
Int. Cl.[4] H04J 3/16, 3/24
U.S. Cl. 370—89 **22 Claims**



1. A method for transferring information between a plurality of bus interface units (BIUs) of a local area network (LAN) wherein a first token is passed from BIU to BIU, said BIUs being allowed to transmit when in control of said first token, said first token being designated to allow transmission of packets having a first predetermined priority, said second token being designated to allow transmission of packets having a second predetermined priority, said method comprising the step of:
providing a second token to be passed from BIU to BIU, each said BIU being allowed to transmit information while in control of either said first or second token, said second token being present on said LAN simultaneously with said first token.

4,707,831
PACKET SWITCHING SYSTEM

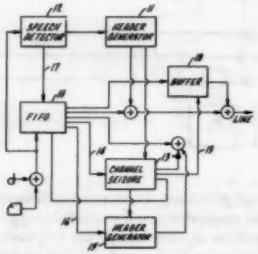
Donald A. Weir, deceased, late of Goff's Oak, England by Jean C. Weir, executrix ; William A. G. Walsh, Hertford Heath, and Richard C. Slatter, Watton at Stone, both of England, assignors to STC plc, London, England

Filed Oct. 23, 1985, Ser. No. 790,560

Claims priority, application United Kingdom, Oct. 25, 1984, 8426955

Int. Cl.[4] H04J *3/24;* **H04Q** *3/00*

U.S. Cl. 370—94 **5 Claims**



1. In an electrical intelligence transmission system in which both speech and data are transmitted as packets over virtual connections set up in a digital switching network, with both said speech and data packets being transmitted at a given bit rate associated with said transmission system wherein transmitted speech packets cannot undesirably be unduly delayed as being a real time phenomenon while data packets can be transmitted at greater delays, in combination therewith of apparatus in assigning speech packets greater priority than data packets, comprising:

first storage means responsive to both speech and data packets for storing the same prior to transmission via said network,

means coupled to said storage means for seizing an available channel for transmitting said stored packets,

means for detecting said packets to provide an output when a speech packet is detected, to terminate the further storage of data packets upon said detection of a speech packet and to enable said first storage means to store data packets during the absence of a speech packet,

second storage means coupled to said first storage means and operative to store any data packets in said first storage means upon the detection of said speech packet and enabling the transmission of said stored data packet when speech packets are not detected, whereby speech packets are transmitted on said channel with priority to data packets to enable speech packets to always be promptly transmitted when an available channel is seized.

4,707,832
SWITCHED POINT-TO-POINT LOCAL AREA NETWORK CONTROL MECHANISM

Raymond R. Glenn, Round Rock, Tex.; Andrew T. Powsbok, Indialantic, Fla.; Robert S. Padgett, Melbourne, Fla.; Pedro Uriarte, Indian Harbour Beach, Fla.; Joseph B. Cain, Indialantic, Fla., and Gautam H. Thaker, West Melbourne, Fla., assignors to Harris Corporation, Melbourne, Fla.

Filed Apr. 10, 1985, Ser. No. 721,645

Int. Cl.[4] H04J *1/00, 3/12*

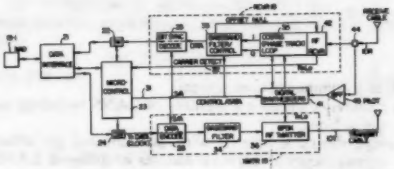
U.S. Cl. 370—124 **36 Claims**

1. For use in a communication network wherein a plurality of stations may communicate with one another over a prescribed transmission medium through the use of transceiver equipment thereat, a method of establishing a communication link between first and second stations, so that said first and second stations may convey messages therebetween over said communication link comprising the steps of:

(a) establishing a spectrum of carrier frequencies within which are defined a control carrier frequency to be modulated with control information to be exchanged among stations of the network and a plurality of data carrier frequencies to be modulated with data to be exchanged among stations of the network;

(b) at said first station, controllably tuning the transceiver equipment thereat to locate a pair of data carrier frequencies that are available for use for conveying data messages thereover;

(c) at said first station, tuning the transceiver equipment thereat to said control carrier frequency and transmitting a control message over said control frequency to said second station identifying said located pair of data carrier frequencies; and



(d) at said first and second stations, tuning the transceiver equipment thereat to said pair of data carrier frequencies so as to effectively establish said communication link between said first and second stations so that messages may be conveyed therebetween by the modulation of said pair of data carrier frequencies with signals representative of data to be exchanged, and wherein step (c) includes, at said first station,

(c1) tuning the transceiver equipment thereat to said control carrier frequency and examining the utilization of said control carrier frequency, and

(c2) upon detecting the utilization of said control carrier frequency to be representative of a prescribed probability of success in conveying a control message thereover to said second station, proceeding to transmit said control message.

4,707,833
FAULT-COMPENSATING DIGITAL INFORMATION TRANSFER APPARATUS

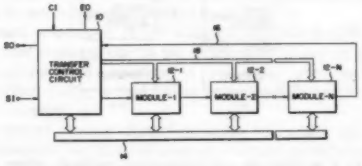
Kiichiro Tamaru, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Japan

Filed Apr. 18, 1985, Ser. No. 724,465

Claims priority, application Japan, Apr. 19, 1984, 59-79128

Int. Cl.[4] G06F *11/00*

U.S. Cl. 371—15 **8 Claims**



1. A digital information transfer apparatus for transferring information to and from each of a plurality of function modules, said apparatus comprising:

common bus means coupled to each of the function modules for transferring information to and from each of the function modules;

scan path means for coupling respective ones of the function modules to each other in series;

shift register means including a plurality of register circuits for temporarily storing information, each of said register circuits being coupled to said common bus means and being coupled in series to a corresponding one of the function modules, and each of said register circuits except a last one of said register circuits being coupled in series to a sequential one of said register circuits by said scan path means, each of said register circuits being adapted to temporarily store information for one of the function modules;

detecting means coupled to said common bus means for detecting a failure of said common bus means and generating an error signal in response to said failure detection;

control means coupled to said common bus means and to said detecting means, and coupled by said scan path means to a first and said last one of said register circuits, for transferring information to and from each of the function modules in parallel over said common bus means during absence of said error signal, and for transferring information to and from the function modules in series over said scan path means in response to said error signal.

4,707,834

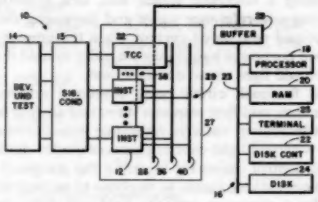
COMPUTER-BASED INSTRUMENT SYSTEM

Arnold M. Frisch, Portland; Allen L. Hollister, and Larry L. Hutchinson, both of Beaverton, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Sep. 17, 1985, Ser. No. 777,104

Int. Cl.[4] G06F *11/00*

U.S. Cl. 371—20 **18 Claims**



1. An apparatus for controlling and coordinating operations of a plurality of instruments in cooperative performance of a procedure, each instrument being configured to perform a portion of said procedure by an associated instrument computer in accordance with a set of configuration instructions and to generate first control signals and to respond to second control signals, said first and second control signals coordinating operations of said instruments in the course of performing said procedure, the apparatus comprising:

master controller means for generating configuration instructions for each instrument computer;

timing controller means responsive to said first control signals for generating said second control signals;

a first bus, interconnecting the instrument computer associated with each said instrument to said master controller means, for carrying said configuration instructions to each said instrument computer; and

a second bus, connecting each said instrument to said timing controller means, for carrying said first and second control signals between each said instrument and said timing controller means.

4,707,835

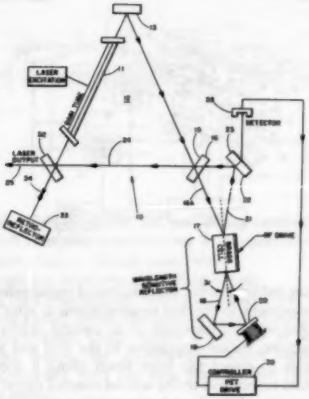
RAPID WAVELENGTH SWITCHING OF IR LASERS WITH BRAGG CELLS

Hans W. Mocker, Minneapolis, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jun. 17, 1986, Ser. No. 875,113

Int. Cl.[4] H01S *3/10*

U.S. Cl. 372—20 **11 Claims**



1. Apparatus for rapid switching among discrete wavelengths within the output spectrum of a gas laser, including:

a primary optical cavity including a gain tube for emitting radiation having a range of wavelengths, means defining a first surface for reflecting said radiation, and means defining a second surface for partially reflecting and partially transmitting said radiation; said first and second surfaces positioned with respect to said gain tube to form said primary optical cavity and to reflect the radiation essentially along a first path within said primary cavity;

means defining a third surface for reflecting the radiation and positioned to reflect a portion of the radiation, transmitted beyond said primary cavity through said second surface, back towards said second surface essentially in a second path within a secondary optical cavity formed by said second and third surfaces and in tandem with the primary cavity, whereby at least some of the portion of the radiation is injected back into said primary cavity through the second surface; and

a signal modulating means in said secondary cavity for selectively enhancing a predetermined wavelength with respect to the other radiation wavelengths from within said range, whereby radiation injected into the primary cavity from the secondary cavity through said second surface is essentially of said predetermined wavelength, said signal modulating means being variable to effect rapid switching among alternative predetermined wavelengths from within said range.

4,707,836

LASER CONTROL SYSTEM

Alan J. B. Travis, Abingdon, England, assignor to United Kingdom Atomic Energy Authority, London, England

Filed Aug. 12, 1985, Ser. No. 764,643

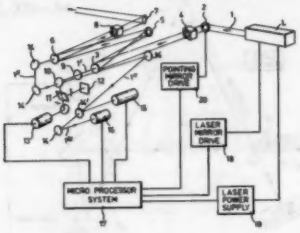
Claims priority, application United Kingdom, Aug. 16, 1984, 8420861

Int. Cl.[4] H01S *3/13*

U.S. Cl. 372—29 **7 Claims**

1. An apparatus for monitoring and controlling a beam of radiation from a laser, comprising means for directing at least a portion of the laser beam at a means for determining the

transverse distribution of energy within the laser beam under far field conditions and producing a first control signal related thereto, means for directing a second portion of the laser beam at a means for determining the transverse distribution of energy within the laser beam under near field conditions and producing a second control signal related thereto, and means for directing a known proportion of the laser beam at a means for measuring the total power within the said proportion of the



laser beam and producing a third control signal related thereto, means responsive to the first control signal to alter the postion of a mirror which forms part of an optical cavity within the laser structure, means responsive to the first and second control signals to direct the laser beam along a predetermined path, means responsive to the second control signal to maintain the divergence of the laser beam within predetermined limits, and means responsive to the third control signal to vary the amount of power supplied to the laser.

4,707,837

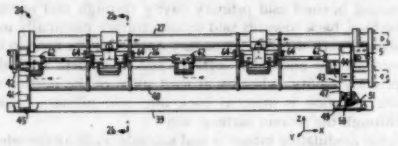
DISTRIBUTIVE LASING SYSTEM

Donald Bennett, Portola Valley, and Richard J. Saunders, San Jose, both of Calif., assignors to Coherent, Inc., Palo Alto, Calif.

Continuation of Ser. No. 492,480, May 6, 1983. This application Nov. 4, 1985, Ser. No. 794,477

Int. Cl.[4] H01S *3/04, 3/045*

U.S. Cl. 372—34 **12 Claims**



1. A laser system comprising:

a common fluid lasing medium;

a plurality of lasers, each laser comprising:

a discharge tube;

a means for supporting and aligning an optical resonator structure with said discharge tube;

said lasing medium flows through and is enclosed in said supporting means;

means for maintaining said medium in said supporting means at a substantially constant temperature, such that said supporting means maintains the alignment of said resonator structure;

said discharge tube includes means for exciting said lasing medium;

said discharge tube being positioned in and aligned with said optical resonator structure;

said discharge tube receives said lasing medium from said supporting means, and passes said medium away from said supporting means after excitation to an exhaust tube so that said supporting means continues to be maintained at a substantially constant temperature; and

means for delivering a fluid lasing medium from said common fluid lasing medium to each laser.

4,707,838

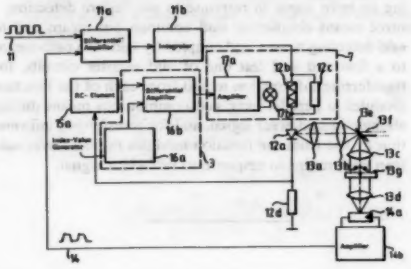
CURRENT SUPPLY FOR RADIATION SOURCES OF FREQUENCY-PROPORTIONAL OPTICAL SENSORS

Alfred Reule, and Joachim Schröder, both of Aalen, Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Heidenheim, Fed. Rep. of Germany

Filed Mar. 5, 1986, Ser. No. 836,242

Int. Cl.[4] H01S *3/00, 3/13;* **G01J** *1/32*

U.S. Cl. 372—38 **15 Claims**



1. A current supply for a light-emitting semiconductor device for a frequency-proportional optical sensor, the current supply generating a modulated current thereby producing a time modulated light signal having a constant amplitude and a certain delay time, said currrent supply comprising:

a first feedback circuit with a first response time including: a reference photoelectric receiver for receiving a portion of the light emitted by said semiconductor device and for generating a reference signal; and, first control means receiving said reference signal and increasing the amplitude of said modulated current when the intensity of the received portion of light lowers in order to hold the amplitude of said light signal constant; and,

a second feedback circuit with a second response time slower than said first response time, said second feedback circuit including: variable resistance means connected in series with said light-emitting semiconductor device; and, second control means for lowering the resistance of said variable resistance means in response to an increase in the modulated current in order to hold said delay time constant.

4,707,839

SPREAD SPECTRUM CORRELATOR FOR RECOVERING CCSK DATA FROM A PN SPREAD MSK WAVEFORM

Carl F. Andren, Indialantic, and David A. Olaker, Palm Bay, both of Fla., assignors to Harris Corporation, Melbourne, Fla.

Filed Sep. 26, 1983, Ser. No. 535,923

Int. Cl.[4] H04K *1/02*

U.S. Cl. 375—1 **23 Claims**

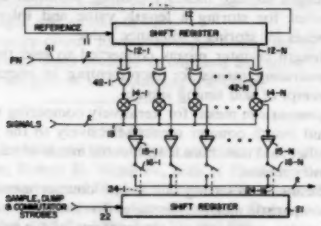
20. A spread spectrum signal demodulation apparatus for a recovering information signals that have been combined with a prescribed encoding sequence and spread spectrum-modulated onto a carrier for transmission comprising:

first means for storing a replica of said prescribed encoding sequence;

second means for combining said replica of said prescribed encoding sequence with signals corresponding to the spreading sequence through which the combined information signals have been modulated onto said carrier; and

third means for correlating the output of said second means with received unknown information signals to obtain an

output representative of the original information signals, said third means comprising a plurality of respective correlator stages, each stage correlating a first input with a second input and generating a respective output representative of the correlation between said first and second inputs, said first input corresponding to a respective portion of the output of said second means and said second input. corresponding to said received unknown information signals, and including an output link from which said output representative of the original information signals is derived, and including means for selectively coupling the outputs of said respective correlator stages to said output link.

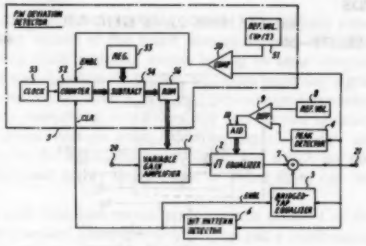


4,707,840

LINE EQUALIZER HAVING PULSE-WIDTH DEVIATION DETECTOR FOR COMPENSATING LONG-TERM LEVEL VARIATIONS

Kenji Nakayama, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Nov. 5, 1986, Ser. No. 927,036
Claims priority, application Japan, Nov. 5, 1985, 60-246351
Int. Cl.[4] H04B *3/20*
U.S. Cl. 375—14 **7 Claims**



1. An adaptive line equalizer for a transmission line having a limited bandwidth, comprising:

frequency equalizer means having a frequency response characteristic substantially inverse to the frequency response characteristic of said transmission line for equalizing a pulse signal;

deviation detector means for detecting the duration of a pulse in said equalized pulse signal and detecting a deviation of said detected duration from a reference value; and

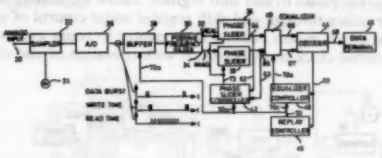
variable gain amplifier means connected in series with said frequency equalizer means for amplifying said pulse signal with a gain variable as a function of said detected deviation.

4,707,841

DIGITAL DATA RECEIVER FOR PREAMBLE FREE DATA TRANSMISSION

Jui L. Yen, and Rui Wang, both of Toronto, Canada, assignors to University of Toronto, Innovations Foundation, Toronto, Canada

Filed Aug. 21, 1984, Ser. No. 642,903
Int. Cl.[4] H04L *7/00*
U.S. Cl. 375—106 **27 Claims**



1. A data receiver system for processing received analog signals which comprise data encoded with a plurality of symbols, the data receiver system comprising:

input means for receiving the analog signal;

sampling means associated with the input means for sampling the analog signal, said sampling means being coupled to asynchronous clock means connected to drive the sampling means, the asynchronous clock means being unsynchronised with the data transmission rate of said analog signal;

analog to digital converter means connected to the output of the sampling means for digitizing said sampled analog signal to provide a digital signal;

digital storage means connected to the output of the analog to digital converter means for storing said digital signal therein;

symbol acquisition means having a first input connected to the output of the storage means for acquiring said symbol information from said digital signal;

symbol acquisition control means having an input connected to the output of the symbol acquisition means, and an output connected to a second input of said symbol acquisition means, said symbol acquisition control means constituting means effective to obtain correctly timed symbols by interpolation;

decoder means having an input connected to the output of the symbol acquisition means, said decoder means generating decoded digital data from said correctly timed symbols, said decoder means having an output for outputting said decoded digital data, and

replay processing control means, said replay processing control means being operable when the system receives said analog signal, and having an input from said decoder means and an output to said digital storage means for instructing said digital storage means to replay the entire digital signal to ensure that the entire digital signal is used for communication.

4,707,842

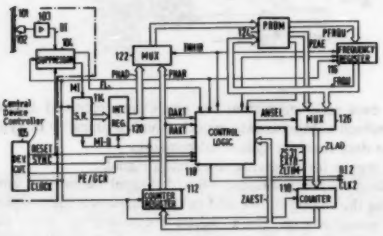
APPARATUS AND METHOD FOR ACQUIRING DATA AND CLOCK PULSES FROM ASYNCHRONOUS DATA SIGNALS

Helmut Fischer, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Mar. 26, 1986, Ser. No. 844,353
Claims priority, application Fed. Rep. of Germany, Apr. 3, 1985, 3512224
Int. Cl.[4] H04L *7/02*
U.S. Cl. 375—110 **21 Claims**

1. In a circuit arrangement for the reacquiring of data signals and data clock signals from a self clocking transmission, including a digital phase control circuit, an internal clock for said

digital phase control circuit, and means for supplying to said digital phase control circuit marker pulses identifying the time of arrival of data signal edges and edge signals indentifying the direction of the data signal edge which has occurred most recently, said digital phase control circuit comprising, in combination, a presettable counter functioning as a controllable oscillator, means responsive to said internal clock for loading said counter with an initial value corresponding to the frequency of the current data clock to define an updated time base of the phase control circuit, a shift register, means for applying said marker pulses to said shift register, means for shifting said marker pulses through said shift register under control of said internal clock, means causing said counter to count cycles of said internal clock in synchronism with operation of said shift



register, a counter storage register connected to said counter, an intermediate storage register connected to said shift register, said counter storage register being operative to store the current state of said counter as a leading phase value, said intermediate storage register being operative to store the position of the marker pulses within said shift register as a trailing phase value, said counter storage register and said intermediate storage register being alternately operable in accordance with whether the appearance of said marker pulse at the serial output of said shift register occurs before or after a predefined counter reading, and rated value generator means connected to said storage register and to said intermediate storage register for generating a new initial value in response to one of said phase values, and means for presetting said counter with said new initial value.

4,707,843

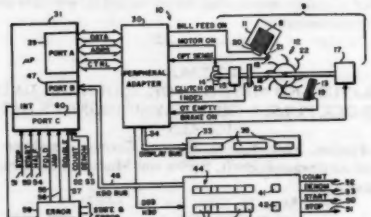
RELATING TO MICROPROCESSOR CONTROLLED CASH COUNTING APPARATUS

Ronald McDonald, Milford, and John A. Hengeveld, Framingham, both of Mass., assignors to American Coin Currency Equipment Corporation, Dorchester, Mass.

Filed May 3, 1985, Ser. No. 730,238

Int. Cl.[4] G06M *7/00*

U.S. Cl. 377—8 **14 Claims**



1. A control system for a cash counting machine including bill feed means comprising an input hopper for receiving a stack of bills, an output tray and transfer means for transferring each bill individually from said input hopper to said output tray to define a bill feed path, bill sensing means proximate said bill feed path for generating a bill feed signal in response to the passage of the leading edge of a bill thereby, and for negating said bill feed signal in response to the passage of the trailing edge of the bill thereby, said control system including:

A. timing signal generating means for generating a timing signal;

B. length storage means including minimum length entry means for storing a length value and tolerance entry means for storing a tolerance value;

C. length counter means connected to said timing signal generating means for incrementing in response to the receipt of said timing signal;

D. comparison means for iteratively comparing the value of said length counter means selectively to the contents of either said minimum length entry means or said tolerance entry means;

E. means for resetting said length counter means after said comparison means determines that the value of said length counter means equals the contents of the selected minimum counter means or said tolerance storage means;

F. comparison control means for controlling the selection of the minimum length entry means and said tolerance entry means by said comparison means, said comparison control means initially selecting said minimum length entry means and, when said resetting means resets the length counter means, thereafter selecting said tolerance storage means; and

G. detecting means for detecting the state of said bill feed signal after said comparison means determines that the value of said length counter means equals the contents of said minimum counter means or said tolerance storage means and for enabling said control means to perform predetermined operations in response thereto.

4,707,844

INTEGRATED CIRCUIT HAVING REDUCED CLOCK CROSS-TALK

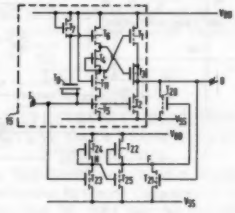
Hendrikus J. M. Veendrick; Adrianus T. Van Zanten, and Leonardus C. M. G. Pfennings, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 18, 1986, Ser. No. 875,806

Claims priority, application Netherlands, Jun. 26, 1985, 8501835

Int. Cl.[4] H03K *23/46*; G11C *7/02*

U.S. Cl. 377—58 **4 Claims**



1. A clock line buffer circuit for use in an integrated circuit having a clock electrode and a clock line for applying a buffered clock voltage having a reference level and an active level to said clock electrode, which comprises:

a first inverter circuit having an input for receiving an unbuffered clock voltage and an output for providing said buffered clock voltage to said clock line;

a clamping FET transistor switch having a drain electrode connected to said first inverter output, a source electrode connected to said reference level, and a gate electrode, said clamping transistor being open when said first inverter output is at the active level and forming a low-

impedance connection between said first inverter output and the reference level when said first inverter output is at the reference level;

a second inverter circuit having an input connected to said first inverter output and an output connected to the gate electrode of said clamping transistor for coupling said gate electrode to said first inverter output;

a third inverter circuit having an input connected to said first inverter input and an output; and

a fourth inverter circuit having an input connected to the output of said third inverter circuit and an output connected to the gate of said clamping transistor.

4,707,845

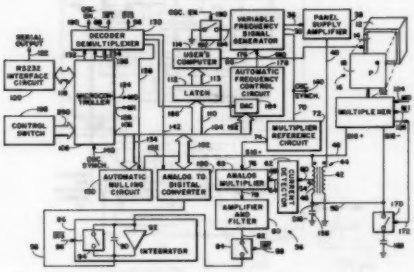
TOUCH PANEL WITH AUTOMATIC NULLING

Philip T. Krein; Robert D. Meadows, both of Portland; Bruce Murdock, Beaverton, and Daniel G. Teichmer, Portland, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Aug. 26, 1986, Ser. No. 900,559

Int. Cl.[4] G08C *21/00*

U.S. Cl. 178—19 **20 Claims**



1. A touch panel device for determining the touch location at which a touch sensing surface of the device is touched comprising:

signal generator means for producing an alternating-current voltage output;

panel scanning signal applying means for applying panel scanning signals to the touch sensing surface, the panel scanning signal applying means having an input coupled to the signal generator output, the panel scanning signal applying means having first and second panel scanning outputs comprising respective first and second alternating-current voltage panel scanning signals which are driven by the signal generator output and which are one hundred and eighty degrees out of phase from one another;

touch signal detection means having inputs coupled to the first and second panel scanning outputs and a touch signal output, the touch signal detection means comprising means for producing touch current signals at the touch signal output corresponding to the difference between the first and second panel scanning signals;

switching means for selectively coupling the first and second panel scanning outputs to the touch sensing surface so as to selectively apply the first and second panel scanning signals to the touch sensing surface and generate touch current signals at the touch signal output upon touching the touch sensing surface;

panel output signal processing means having a first input coupled to the touch signal output for receiving the touch current signals, the panel output signal processing means comprising means for determining the touch location from the touch signals; and

the panel output signal processing means including nulling circuit means for automatically nulling the touch current signals when the touch sensing surface is untouched.

4,707,846

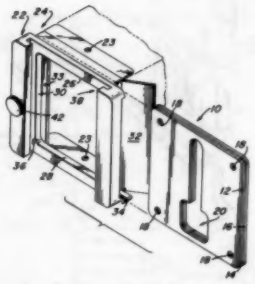
FULL SPINE SHIELDING MEANS

Louis Sportelli, 175 Delaware Ave., Palmerton, Pa. 18071, and James F. Winterstein, 167 Hedge Ct., Glen Ellyn, Ill. 60137

Filed Jun. 12, 1985, Ser. No. 743,797

Int. Cl.[4] G21K *1/00*

U.S. Cl. 378—145 **10 Claims**



1. A masking means for directing radiated energy to a specific area of a subject under observation or inspection comprising a first radiation shielding or filtering means having a vertically oriented elongated opening with a broader portion nearer its distal or lower end, said opening located medially along the horizontal, positioned immediately adjacent to and in front of the collimator of an X-ray radiation generating device within a space in a mount or support means defined by two sets of transverse tracks, a first set of tracks for removably positioning said first shielding or filtering means in said space and a second set of tracks transverse to said first set of tracks capable of removably securing and adjustably positioning a second shielding or filtering means adjustably secured to a substantially rectangular transparent plate, said transparent plate being juxtaposed in front of and against said first shielding or filtering means for retaining said first shielding or filtering means within its defined space and in juxtaposition to the collimator, said second shielding or filtering means being positioned to actively cooperate with said first shielding or filtering means for permitting only the X-ray radiation necessary to cause an image to appear on the X-ray film for the specific area to be observed or inspected to pass through to be filtered by said first and second shielding or filtering means and for blocking unecessary radiation from contacting the subject and causing excessive exposure to such radiation.

4,707,847

DEVICE FOR TAKING A PICTURE OF A JAW PART

Jan Van Aken, Utrecht, Netherlands, assignor to 501 Hecopharma B.V., Cuyk, Netherlands

Filed Feb. 12, 1985, Ser. No. 709,692

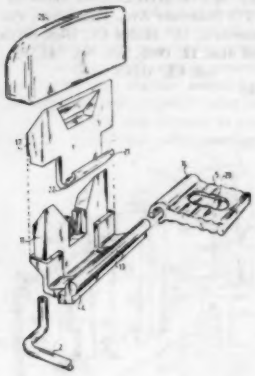
Claims priority, application Netherlands, Jun. 15, 1983, 8302144

Int. Cl.[4] G03B *42/04*

U.S. Cl. 378—170 **18 Claims**

8. A device for positioning a radiation-sensitive plate within a patient's mouth in predetermined relation to a radiation window disposed externally of the patient's mouth, which comprises the combination of a holder and a radiation window carried by said holder, a carrier connected to said holder and having a support surface disposed in spaced, generally opposed relation to said window so as to be positioned in the patient's mouth, a biting element connected with said carrier and projecting therefrom toward said window and having a generally

flat portion so as to be gripped between the patient's teeth, and means fitting over said carrier for releasably locating and positioning a radiation sensitive plate against said surface in aligned relation to said window, said carrier being provided



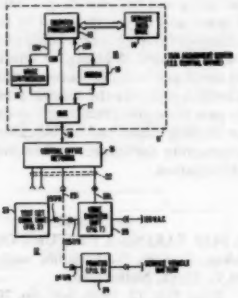
with a step adjacent one boundary of said surface for receiving and locating an edge of the radiation sensitive plate therein, said biting element being slidable relative to said carrier substantially parallel to said window.

4,707,848

TEST SET COMMUNICATION/INTERFACE SYSTEM

Thomas W. Durston; George D. Fleitz; Steven R. Coffelt, all of Camarillo; James D. Eckman, Port Hueneme; Wayne K. Wong, Camarillo, and Theodore E. Chavannes, Thousand Oaks, all of Calif., assignors to Harris Corporation, Melbourne, Fla.

Filed Jul. 25, 1986, Ser. No. 889,276
Int. Cl.[4] H04M *1/00, 3/22*
U.S. Cl. 379—1 **70 Claims**



1. For use with a telephone technician's service device which is adapted to be interfaced with a telephone line for servicing a telephone network, an arrangement for effecting data communications with an information source coupled to said telephone network comprising:

first means, adapted to be coupled to said telephone line, for accessing said information source and causing data communication signals representative of prescribed information to be transmitted from said information source via said telephone network to said service device; and

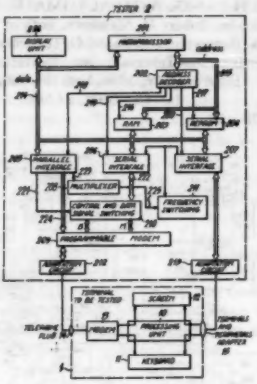
second means, coupled to said first means, for storing information represented by said data communication signals for selective retrieval by said technician.

4,707,849

HIGH SPEED AUTOMATIC TEST APPARATUS ESPECIALLY FOR ELECTRONIC DIRECTORY TERMINALS

Michel Rault, rue de Hingard Brelevenez, 22300 Lannion, and Claude Heno, 99, rue de Toul ar Lann, 22700 Perros-Guirec, both of France

Filed Mar. 3, 1986, Ser. No. 835,251
Claims priority, application France, Mar. 5, 1985, 85 03207
Int. Cl.[4] H04M *1/24*
U.S. Cl. 379—28 **3 Claims**



1. Apparatus for testing a videotex terminal adapted for connection with a telephone subscriber line and a digital peripheral device,

(a) said terminal comprising

(1) a telephone plug (**14**) adapted for connection with the telephone line;

(2) a peripheral plug (**15**) adapted for connection with the digital peripheral device;

(3) a first modem (**13**) connected between said telephone and peripheral plugs for transmitting and receiving two-frequency modulated signals; and

(4) a data processing unit (**10**) having a display screen (**12**) and a keyboard (**11**) connected therewith, said data processing unit being connedted between said first modem and said peripheral plug for processing and switching digital signals between said first modem and said peripheral plug, and between said display screen and said keyboard; and

(b) said testing apparatus comprising

(1) mans including a second modem (**209**) connected with said terminal telephone plug for converting first digital test signals into first two-frequency modulated signals for transmission to said terminal modem and for converting second two-frequency modulated signals that are transmitted by said terminal modem in response to predetermined digital signals received and processed in said terminal data processing unit into first digital response signals;

(2) digital means connected with said terminal peripheral plug for transmitting second digital test signals to said terminal data processing unit and for receiving second digital response signals in response to predetermined digital signals received and processed in said terminal data processing unit; and

(3) data processing means including a test instruction read only memory for deriving said first and second digital

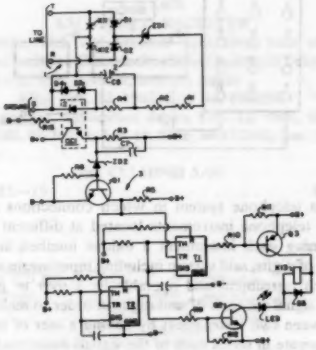
test signals and for checking said first and second digital response signals, said digital test signals being derived in accordance with test instructions and a response signal check.

4,707,850

TEST APPARATUS FOR A SUBSCRIBER LINE

Harold E. Horton, St. Petersburg, and Joseph B. Roberts, Tampa, both of Fla., assignors to General Telephone Co. of Florida, Tampa, Fla.

Filed Oct. 29, 1986, Ser. No. 924,538
Int. Cl.[4] H04M *1/24, 3/28*
U.S. Cl. 379—29 16 Claims



1. A test apparatus for a subscriber line, the apparatus comprising:

switching means including a contacting portion coupled to a multi-wire line for effecting connection between at least two terminals associated with the line and between said terminals and a reference terminal, said switching means further including a control portion at which a signal may be applied so as to establish desired operation of the contacting portion,

means coupled to the line for detecting an activating signal and for generating an isolated signal in response thereto,

a triggering circuit having an input and an output, coupling means for coupling the isolated signal to an input of the triggering circuit,

a first timer and a second timer, each having an input coupled to an output of the trigger circuit, said first timer for providing a first pulse at an output thereof and said second timer for providing a second pulse at an output thereof, said first and second pulses initiated substantially coincidentally and in response to the activating signal and characterized by respective first and second pulse durations, and

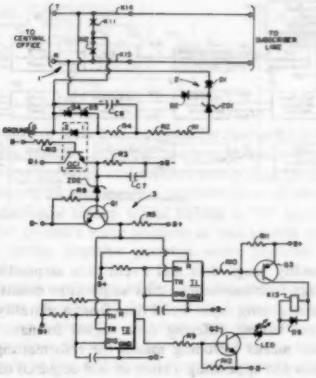
a combining circuit having inputs coupled to the outputs of the first and second timers and an output coupled to the control portion of the switching means so that the switching means operates to effect connection between multi-wire line terminals and the reference terminal subsequent the occurrence of the activating signal, said connection to persist for a duration dependent on the relative durations of the first and second pulses.

4,707,851

REMOTE ISOLATION TEST APPARATUS

Harold E. Horton, St. Petersburg, and Joseph B. Roberts, Tampa, both of Fla., assignors to General Telephone Co. of Florida, Tampa, Fla.

Filed Oct. 29, 1986, Ser. No. 924,539
Int. Cl.[4] H04M *1/24, 3/28*
U.S. Cl. 379—29 21 Claims



1. A remote isolation test apparatus for a telephone line, the apparatus comprising:

double position switching means including a pole terminal for coupling to the central office, including a normally closed contacting portion for coupling to a subscriber line and including a normally open contactiing portion for coupling to the reference terminal, said double position switching means further including a control portion at which a signal may be applied for selectively isolating the central office from the subscriber line and for connecting the central office to the reference terminal,

detecting means coupled to the pole terminal for detecting an activating signal and for generating an isolated signal in response thereto,

a triggering circuit having an input and an output,

coupling means for coupling the isolated signal to an input of the triggering circuit,

a first timer and a second timer, each having an input coupled to an output of the trigger circuit, said first timer for providing a first pulse at an output thereof and said second timer for providing a second pulse at an output thereof, said first and second pulses initiated substantially coincidentally and in response to the activating signal and characterized by respective first and second pulse durations, and

a combining circuit having inputs coupled to the outputs of the first and second timers and an output coupled to the control portion of the switching means so that the switching means operates to isolate the central office from the subscriber line subsequent the occurrence of the activating signal, said isolating condition to persist for a duration dependent on the relative durations of the first and second pulses.

4,707,852

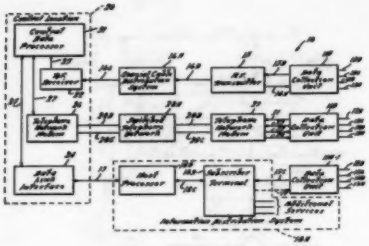
UTILITY USAGE DATA AND EVENT DATA ACQUISITION SYSTEM

Ronald S. Jahr, Naperville, Ill., and Thomas H. Cowell, Corunna, Mich., assignors to Systems and Support, Incorporated, Owosso, Mich.

Division of Ser. No. 310,054, Oct. 9, 1981, Pat. No. 4,504,831. This application Dec. 10, 1984, Ser. No. 679,627

Int. Cl.[4] H04M *11/00*; G08C *19/00*

U.S. Cl. 379—107 **38 Claims**



1. A utility usage data and event data acquisition system comprising, in combination, data acquisition means for automatically acquiring input serial data from a plurality of external sources having differing drive signal formats, said data acquisition means including means for reformatting said acquired data and appending a code to said acquired data, means for transmitting a composite serial data message comprising said acquired data and said code to a central location, and means for initiating the transmission of said composite serial data messages.

4,707,853

ELECTRONIC PRIVATE BRANCH EXCHANGES

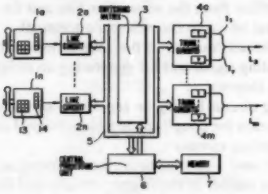
Iwao Hasegawa, Hino, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 28, 1985, Ser. No. 749,674

Claims priority, application Japan, Jun. 28, 1984, 59-133523; Apr. 30, 1985, 60-92991

Int. Cl.[4] H04M *3/42, 15/34*

U.S. Cl. 379—221 **25 Claims**



1. An electronic private branch exchange apparatus comprising:

a plurality of office line trunk circuits for connecting a calling terminal in an exchange network to one of a plurality of office lines;

setting means for setting an order of connection priority for said plurality of office line trunk circuits;

designating means for designating a range of said office line trunk circuits selected according to said order of connection priority in accordance with a time band within which a call is made;

selecting means for selecting one among said plurality of office line trunk circuits in accordance with said order of connection priority in a range designated by said designating means;

alarm means for issuing an alarm when an office line trunk circuit of a last order of priority is selected by said selecting means; and

waiting means for registering a calling request from said calling terminal to an office line trunk circuit, other than the office line trunk circuit of said last order of priority, as a pending wait request when a predetermined operation is made while said alarm is being issued from said alarm means.

4,707,854

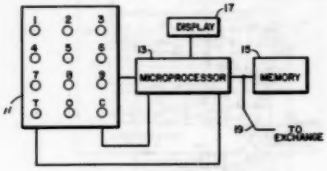
TELEPHONE WITH DIGIT CANCELLATION

Robert T. Mayer, Rye, N.Y., assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 17, 1983, Ser. No. 552,652

Int. Cl.[4] H04M *1/14*

U.S. Cl. 379—356 **8 Claims**



1. In a telephone system in which connections are made between telephone instruments located at different locations by assigning each instrument a unique number including a plurality of digits, said system including input means associated with each instrument and operable by a user to generate a separate signal for each of said digits in order to make connection between two instruments by having a user of one instrument generate in series each of the signals associated with the digits assigned to the second of said instruments, cancellation means associated with each of prescribed ones of said instruments and operable by a user during the serial generation of a plurality of said signals to cancel a predetermined one of said signals regardless of its position in the series, memory means associated with each of said prescribed instruments for storing the signals associated with the digits assigned to another of said instruments, and transmission means associated with each of said prescribed instruments and operable to cause said memory means to transmit its stored signals, said concellation means when operated preventing the transmission of stored signals notwithstanding said transmission means is operated.

4,707,855

PERSONALIZED TELEPHONE SIGNALING CIRCUITRY AND DEVICE, AND METHODS OF CONSTRUCTING AND UTILIZING SAME

Ralph R. Pasinski; Sammy L. Ayers, Jr., and Warren C. Kocmond, Jr., all of Sunnyvale, Calif., assignors to Nobell Inc., Sunnyvale, Calif.

Filed May 31, 1985, Ser. No. 739,709

Int. Cl.[4] H04M *1/00*

U.S. Cl. 379—376 **13 Claims**

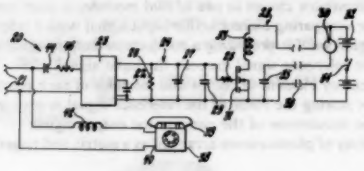
12. A telephone signaling device, comprising, in combination:

a telephone line terminating in a first connector;

a telephone having a telephone cord terminating in a second connector which conventionally is adapted to mechanically and electrically mate with said first connector;

a telephone signaling device electrically and mechanically

interconnected between said first connector and said second connector; and



said telephone signaling device including a toy, animal or human figure with movable and sound-producing features to alert a user that a telephone call is incoming.

4,707,856

AM STEREO RECEIVER

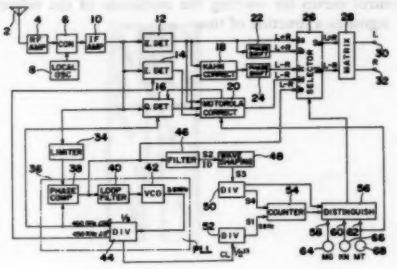
Kanji Tanaka, Ota, and Masashi Arai, Ora, both of Japan, assignors to Sanyo Electric Co., Ltd., Osaka and Tokyo Sanyo Electric Co., Ltd., Gunma, both of, Japan

Filed Feb. 12, 1986, Ser. No. 828,855

Claims priority, application Japan, Feb. 12, 1985, 60-24791; Feb. 12, 1985, 60-24792; Jun. 18, 1985, 60-132162; Jun. 19, 1985, 60-133395

Int. Cl.[4] H04H *5/00*

U.S. Cl. 381—15 **9 Claims**



1. An AM stereo receiver for receiving AM stereo signals containing ID signals which represent different AM stereo systems, said AM stereo receiver comprising:

an IF circuit for generating an IF signal based on a received signal;

a PLL circuit for locking onto the frequency of said IF signal;

a clock circuit for generating a clock signal based on a signal obtained from said PLL circuit;

ID signal detector means responsive to a signal from said PLL circuit for detecting any one of said ID signals and for producing a detected ID signal;

pulse generator means for generating a first pulse signal having a pulse width corresponding to a plurality of cycles of the detected ID signal;

counter means for counting the number of said clock pulses occurring during when said first pulse signal is present; and

distinguishing means for distinguishing each detected ID signal from a number of different ID signals based on the counted result of said counter means, thereby making it possible to distinguish one ID signal from a number of different ID signals with the use of a single circuit path.

4,707,857

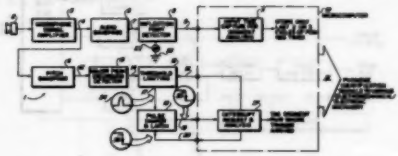
VOICE COMMAND RECOGNITION SYSTEM HAVING COMPACT SIGNIFICANT FEATURE DATA

John Marley, 8715 East Mackenzie Dr., Scottsdale, Ariz. 85251, and Kurt Marley, 4658 East Aire Libre Ave., Phoenix, Ariz. 85032

Filed Aug. 27, 1984, Ser. No. 644,763

Int. Cl.[4] G10L *5/00*

U.S. Cl. 381—43 **22 Claims**



1. A method of speech recognition for recognizing an utterance having positive pressure wave portions and negative pressure wave portions, said method comprising the steps of:

(a) producing an analog signal representative of said speech;

(b) producing a binary signal having a "1" level during positive pressure wave portions of said speech and a "0" level during negative pressure wave portions of said speech;

(c) producing a plurality of first numbers that represent the durations of said "1" levels of said binary signal, and producing a plurality of second numbers that represent the durations of said "0" levels of said binary signal;

(d) computing first and second running averages of said first numbers and said second numbers, respectively;

(e) sampling said running averages at predetermined intervals;

(f) operating on the sampled data to identify and produce event data for significant events of said utterance, including rapidly rising and rapidly falling values of said first running average, silence values of said second running average, and the durations of said significant events;

(g) comparing event data for each significant event of a first group of consecutive events of said utterance to first previously stored reference event data, and identifying any resulting matching;

(h) comparing event data for each significant event of a second group of consecutive events of said utterance beginning immediately after any such matching to second previously stored reference event data and identifying any matching;

(i) repeating steps (g) and (h) for successive groups of said significant events; and

(j) recognizing said utterance if there are fewer than a predetermined number of mismatches, which predetermined number is determined in accordance with a predetermined criteria.

4,707,858

EXTREMELY NARROWBAND COMMUNICATIONS SYSTEM UTILIZING WORD-TO-DIGITAL CONVERSION

Bruce A. Fette, Mesa, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed May 2, 1983, Ser. No. 490,701

Int. Cl.[4] G10L *5/00*

U.S. Cl. 381—43 **6 Claims**

1. A method of extremely narrowband communication comprising the steps of:

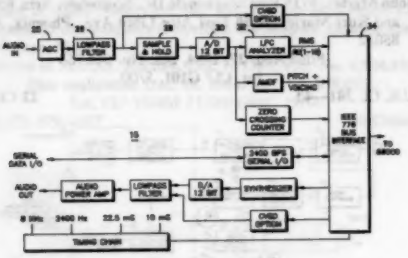
converting human speech to electrical signals;

analyzing the electrical signals to provide a plurality of signals representative of a plurality of properties which characterize a human voice;

storing signals representative of a plurality of spoken words;

comparing at least some of the plurality of signals to the stored signals to determine specific words in the human

speech and supplying signals representative of the specific words; and



converting the supplied signals representative of specific words to a digital form having a rate of less than 300 bits per second.

4,707,859

APPARATUS FOR HIGH SPEED ANALYSIS OF TWO-DIMENSIONAL IMAGES

Graham R. Nudd, Broadway, England, and Emanuel Marom, Beverly Hills, Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 16, 1985, Ser. No. 809,539

Int. Cl.[4] G06K 9/60

U.S. Cl. 382—28 **8 Claims**

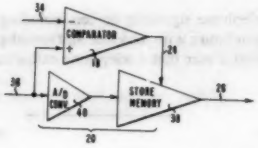
1. Apparatus for analyzing a two dimensional image, comprising:

a plurality of parallel elemental processors logically organized as a multi-level matrix where each elemental processor is associated with one of a plurality of data locations, each elemental processor including a plurality of modules logically distributed over the multiple levels of said matrix;

a comparator circuit in one of said modules in each process for comparing a comparator input signal with a reference signal and for providing a comparator output signal when the reference signal exceeds the input signal;

a memory element in one of said modules in each processor for storing the value of the reference signal in response to the occurrence of the comparator output signal;

an array of photosensors arranged as a matrix and responsive



to light from the image, where each photosensor corresponds with one pixel of the image as well as one of the plurality of data locations and provides a sensor output signal whose magnitude is proportional to the brightness of the corresponding pixel;

means for providing the sensor output signal of each photosensor as the comparator input signal of a corresponding comparator circuit;

means for providing the reference signal to all comparator circuits simultaneously; and

control means for varying the amplitude of the reference signal as a function of time.

292,740

MATERNITY SLACK

Michael D. Viola, Revere, Mass., assignor to J. C. Penney Co., Inc., New York, N.Y.

Filed Mar. 20, 1985, Ser. No. 714,176

Term of patent 14 years

U.S. Cl. D2—28

292,741

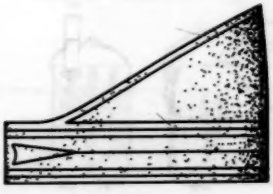
HEEL SHIELD

Michael McFerrin, 1697 Broadway #402, Ann Arbor, Mich. 48105

Filed Jun. 3, 1985, Ser. No. 740,283

Term of patent 14 years

U.S. Cl. D2—314



292,742

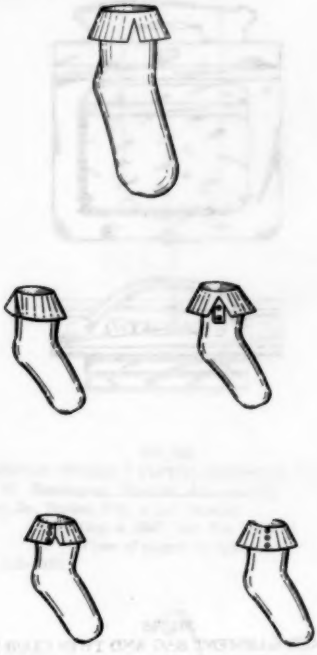
SOCK OR SIMILAR ARTICLE

Rebecca W. Pranica, Appleton, Wis., assignor to Zwicker Knitting Mills, Appleton, Wis.

Filed Jul. 2, 1984, Ser. No. 627,271

Term of patent 14 years

U.S. Cl. D2—329



292,743

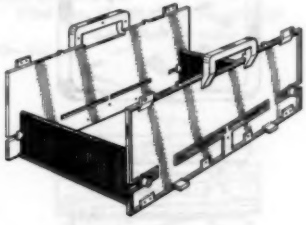
CIRCUIT BOARD CARRIER

Patrick Hung, Toronto, Canada, assignor to Patrick Plastics Inc., Weston, Canada and Glomar Southeast Asia (PTE) Ltd., Singapore

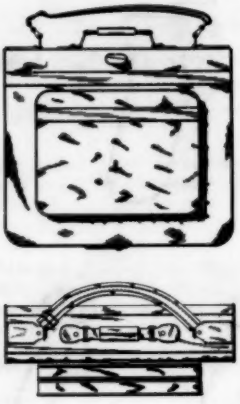
Filed Nov. 15, 1984, Ser. No. 671,607

Term of patent 14 years

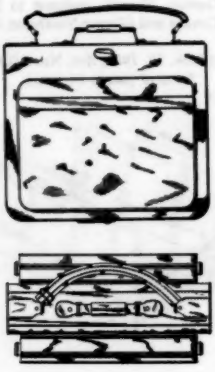
U.S. Cl. D3—30.1



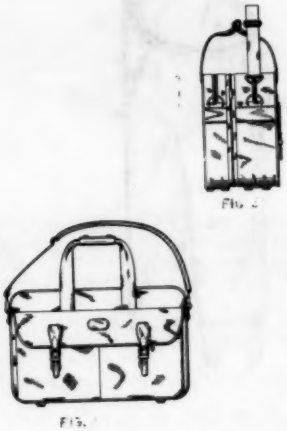
292,744
COMBINED GARMENT BAG AND BRIEFCASE
James H. Allen, Covington, Ky., assignor to 'totes', Incorporated, Loveland, Ohio
Filed Feb. 27, 1985, Ser. No. 706,171
Term of patent 14 years
U.S. Cl. D3—48



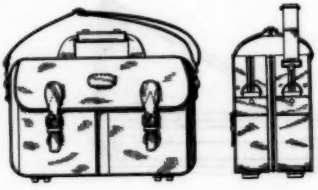
292,745
COMBINED GARMENT BAG AND TWIN CLUB BAGS
James H. Allen, Covington, Ky., assignor to 'totes', Incorporated, Loveland, Ohio
Filed Feb. 27, 1985, Ser. No. 706,198
Term of patent 14 years
U.S. Cl. D3—48



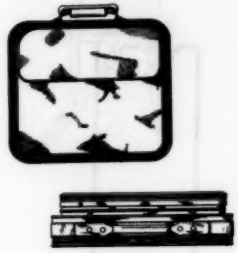
292,746
COMBINED BRIEFCASE AND SPORT BAG
James H. Allen, Covington, Ky., assignor to 'totes', Incorporated, Loveland, Ohio
Filed Feb. 27, 1985, Ser. No. 706,199
Term of patent 14 years
U.S. Cl. D3—48



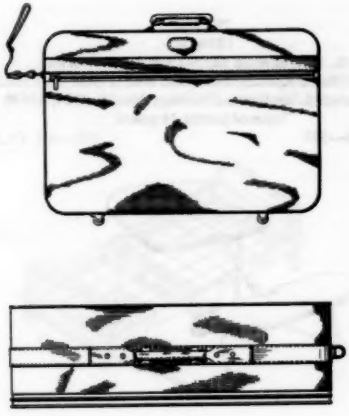
292,747
COMBINED CLUB BAG AND SPORT BAG
James H. Allen, Covington, Ky., assignor to 'totes', Incorporated, Loveland, Ohio
Filed Feb. 28, 1985, Ser. No. 706,657
Term of patent 14 years
U.S. Cl. D3—48



292,748
COMBINED BRIEFCASE AND OVERNIGHT CASE
James H. Allen, Covington, Ky., assignor to 'totes', Incorporated, Loveland, Ohio
Filed Feb. 27, 1985, Ser. No. 706,200
Term of patent 14 years
U.S. Cl. D3—71

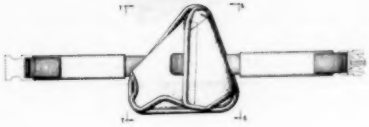


292,749
SUITCASE
James H. Allen, Covington, Ky., assignor to 'totes', Incorporated, Loveland, Ohio
Filed Feb. 28, 1985, Ser. No. 706,658
Term of patent 14 years
U.S. Cl. D3—71



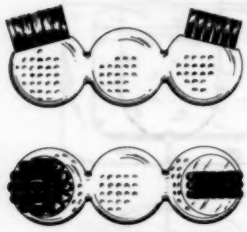
292,750
WHISTLE LANYARD FOR USE BY SPORTS' OFFICIAL
Brent E. Smith, 1261 E. 8285 South, Sandy, Utah 84070
Filed Dec. 4, 1984, Ser. No. 677,977
Term of patent 14 years
U.S. Cl. D3—100

292,751
COMBINED ASSAULT PISTOL HOLSTER AND BELT
Robert W. Remington, Kamiah, Id., assignor to Claude R. Wimer, Jr., Naples, Fla., a part interest
Filed Oct. 4, 1985, Ser. No. 784,493
Term of patent 14 years
U.S. Cl. D3—101

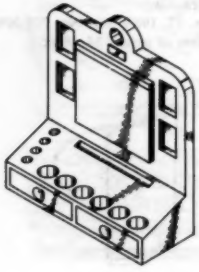


292,752
KNIFE SHEATH
Julius H. Reinhardt, Atlanta, Ga., assignor to Atlanta Cutlery Corporation, Conyers, Ga.
Filed Jun. 17, 1985, Ser. No. 745,069
Term of patent 14 years
U.S. Cl. D3—102

292,753
GOLFERS BRUSH
Fred A. Clayton, 2438 Rutland Ct., Wichita, Kans. 67226, and John Arma, Jr., 1006 S. Emporia, Wichita, Kans. 67211
Filed Sep. 12, 1985, Ser. No. 775,228
Term of patent 14 years
U.S. Cl. D4—119



292,754
EASEL
Francis J. Mascenic, Jr., 306 E. Van Buren, Malta, Ill. 60150
Filed Apr. 22, 1985, Ser. No. 725,777
Term of patent 14 years
U.S. Cl. D6—300

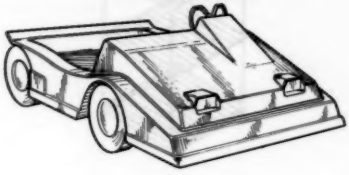


292,755
BOOT HANGER
John Shay, Box 791, Ponca City, Okla. 74602
Filed Jan. 28, 1985, Ser. No. 695,560
Term of patent 14 years
U.S. Cl. D6—317

292,756
CHAIR
Peter Opsvik, Hogtunveien 12, N-1370 Asker, Norway
Filed Apr. 25, 1985, Ser. No. 727,257
Claims priority, application Norway, Nov. 6, 1984, 65690
Term of patent 14 years
U.S. Cl. D6—335

292,757
CHAIR
John M. Giordano, 200 Pine Hollow Rd., Norfolk, Va. 23502
Filed Dec. 31, 1984, Ser. No. 688,172
Term of patent 14 years
U.S. Cl. D6—380

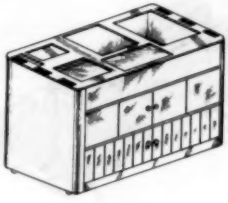
292,758
CHILDREN'S BED
William Bethune, 42229 Irwin, Mt. Clemens, Mich. 48043
Filed Sep. 21, 1984, Ser. No. 652,712
Term of patent 14 years
U.S. Cl. D6—388



292,759
ROLLAWAY BED
William Pell, Rte. 2, Box 359D, Albertville, Ala. 35950
Filed Jan. 28, 1985, Ser. No. 695,232
Term of patent 14 years
U.S. Cl. D6—392

292,760
ORIENTAL CHEST
Carol D. Worth; Ann B. Worth, and Charles C. Worth, all of Kentfield, Calif., assignors to Charles C. Worth Corporation, Kentfield, Calif.
Filed Feb. 28, 1985, Ser. No. 706,931
Term of patent 14 years
U.S. Cl. D6—434

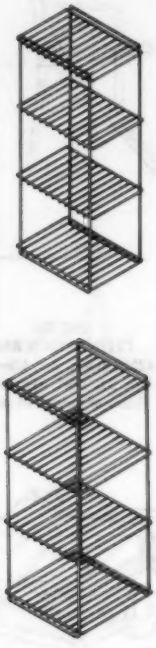
292,761
MOBILE MUSIC AND RECORDING STORAGE UNIT
William E. Dewart, Whitemarsh, and David S. Lovitz, Philadelphia, both of Pa., assignors to Durland & Associates, Ltd., Whitemarsh, Pa.
Filed Jan. 10, 1985, Ser. No. 690,260
Term of patent 14 years
U.S. Cl. D6—445



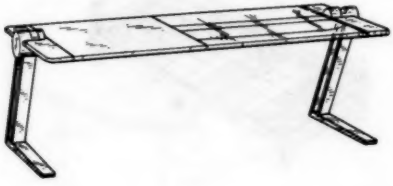
292,762
TABLE
Violetta Williamson, 1423 Easton Ave., Bethlehem, Pa. 18018
Filed Feb. 25, 1985, Ser. No. 705,440
Term of patent 14 years
U.S. Cl. D6—451

292,763
STAND FOR PRINTERS AND COMPUTERS
Beverly C. Rich, 111 W. Timonium Rd., Timonium, Md. 21093
Filed Apr. 1, 1985, Ser. No. 718,475
Term of patent 14 years
U.S. Cl. D6—462

292,764
MODULAR DISPLAY RACK
Melvin E. Kester, Concord, N.C., assignor to Fieldcrest Cannon, Inc., Eden, N.C.
Filed Aug. 30, 1984, Ser. No. 646,359
The portion of the term of this patent subsequent to Nov. 10, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—465



292,765
WORKTABLE OR SIMILAR ARTICLE
Hartmut H. Esslinger, Los Gatos; Barry Wingate, Palo Alto, both of Calif., and Thomas Gingele, Altensteig, Fed. Rep. of Germany, assignors to Frogdesign Hartmut Esslinger Inc., Campbell, Calif.
Filed Feb. 8, 1985, Ser. No. 699,695
Claims priority, application Fed. Rep. of Germany, Aug. 9, 1984, 5MR88
Term of patent 14 years
U.S. Cl. D6—484



292,766
CABINET DOOR

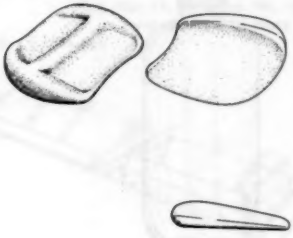
James J. Palka, Kildeer, Ill., assignor to Pace Industries, Inc., Chicago, Ill.

Filed Jul. 12, 1985, Ser. No. 754,427
Term of patent 14 years
U.S. Cl. D6—494

292,767
PILLOW

Judith B. Challen, 8 Hicks Crescent, Echuca, Victoria, 3625, Australia

Filed Mar. 12, 1985, Ser. No. 711,038
Claims priority, application Australia, Sep. 18, 1984, 8914/84
Term of patent 14 years
U.S. Cl. D6—601



292,768
FOOD SERVICE TRAY

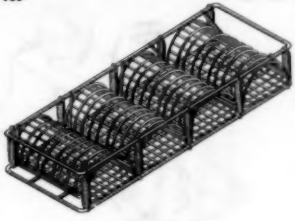
Robert L. Kearney, Lilburn, Ga., assignor to KBR, Inc., Norcross, Ga.

Filed Jul. 25, 1986, Ser. No. 889,267
Term of patent 14 years
U.S. Cl. D7—38

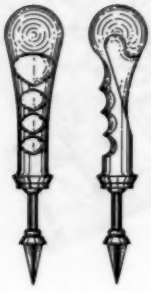
292,769
HAM FRAME

James S. Hardenbergh, Waupaca, Wis.; Curtis L. Knipe, Ames, Iowa, and William R. Stuesser, New London, Wis., assignors to Sara Lee Corporation, Winston-Salem, N.C.

Filed Mar. 11, 1985, Ser. No. 710,405
Term of patent 14 years
U.S. Cl. D7—409



292,770
CAN PIERCER
Russell S. Scurto, 417 Greenwood Dr., Round Lake Park, Ill. 60073
Filed Mar. 25, 1985, Ser. No. 715,990
Term of patent 14 years
U.S. Cl. D8—18



292,771
RATCHET WRENCH
Bonjue Kim, P.O. Box 3689, Wayne, N.J. 07470
Filed May 13, 1985, Ser. No. 733,538
Term of patent 14 years
U.S. Cl. D8—25

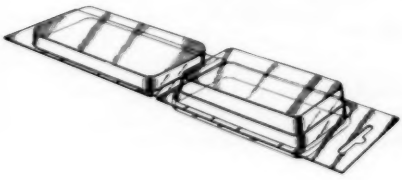
292,772
COMBINATION STAPLE REMOVER AND TAPE CUTTER
William A. Skewis, 171 W. Spruce St., Sequim, Wash. 98382
Filed Mar. 11, 1985, Ser. No. 710,297
Term of patent 14 years
U.S. Cl. D8—48

292,773
DISPENSING CONTAINER
Bradley C. Carlson, 205 Barry Ave. S., Apt. #106, Wayzata, Minn. 55391
Filed May 31, 1985, Ser. No. 739,897
Term of patent 14 years
U.S. Cl. D9—300

292,774
MULTIPLE UNIT BOTTLE
George L. McGraw, 875 Park Creek Ct., Marietta, Ga. 30064
Filed Apr. 29, 1985, Ser. No. 728,547
Term of patent 14 years
U.S. Cl. D9—307

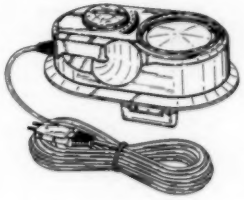
292,775
COMBINED DISPENSING CONTAINER AND SOLID STICK PRODUCT
James M. Keeler, Ridgewood; John A. Grip, Wayne, and Edward Morris, Paramus, all of N.J., assignors to American Cyanamid Company, Stamford, Conn.
Filed Nov. 14, 1984, Ser. No. 671,653
The portion of the term of this patent subsequent to Oct. 27, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D9—338

292,776
PACKAGING CONTAINER
Derwyn Cugley, Brea, Calif., assignor to VSI Fasteners, Inc., Stanton, Calif.
Filed May 13, 1985, Ser. No. 733,096
Term of patent 14 years
U.S. Cl. D9—415

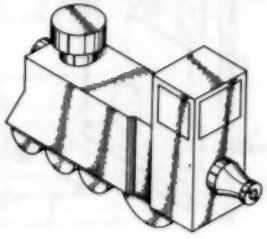


292,777
LOCKING ONE-WAY CLOSURE FOR DISPOSABLE CONTAINERS
Richard A. Shillington, San Clemente, and Alec Oberschmidt, Leucadia, both of Calif., assignors to Med-Safe Systems, Inc., Encinitas, Calif.
Filed Apr. 3, 1985, Ser. No. 719,544
Term of patent 14 years
U.S. Cl. D9—446

292,778
HUMIDITY SENSOR
Franco Clivio, Zürich, Switzerland, and Dieter Raffler, Neu-Ulm, Fed. Rep. of Germany, assignors to Gardena Kress & Kastner GmbH, Fed. Rep. of Germany
Filed Feb. 28, 1985, Ser. No. 706,800
Claims priority, application Fed. Rep. of Germany, Sep. 6, 1984, GRAIII19888403
Term of patent 14 years
U.S. Cl. D10—56

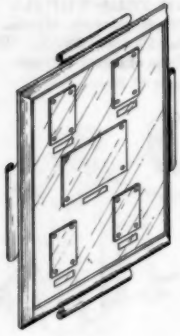


292,779
TOY TRAIN WHISTLE
Charles L. Bayly, 1731 Washington, Algonac, Mich. 48001
Filed May 29, 1985, Ser. No. 739,089
Term of patent 14 years
U.S. Cl. D10—119



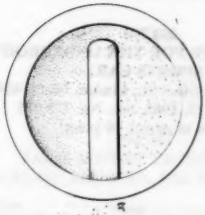
292,780
EARRING
Robert J. Galask, 1447 Harvard St., Apartment 4, Santa Monica, Calif. 90404
Filed Sep. 26, 1985, Ser. No. 781,128
Term of patent 14 years
U.S. Cl. D11—48

292,781
DISPLAY PLAQUE
Robert W. Shane, 11 Oldfield La., Mooresville, Ind. 46158
Filed May 16, 1984, Ser. No. 611,053
Term of patent 14 years
U.S. Cl. D11—132



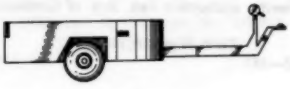
292,782
FLAGPOLE HOLDER
Julian Restrepo, Medellin, Colombia, assignor to J.R.C. Flag Holders Corporation, Miami, Fla.
Filed Apr. 2, 1985, Ser. No. 719,098
Term of patent 14 years
U.S. Cl. D11—182

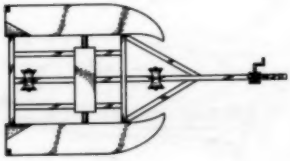
292,783
FLAGPOLE HOLDER
Julian Restrepo, Medellin, Colombia, assignor to J.R.C. Flag Holders Corporation, Miami, Fla.
Filed Apr. 2, 1985, Ser. No. 718,977
Term of patent 14 years
U.S. Cl. D11—182



292,784
ATHLETIC SHOE
James C. Autry, Dallas, Tex., assignor to Autry Industries, Inc., Dallas, Tex.
Continuation-in-part of Ser. No. 915,330, Oct. 3, 1986, Pat. No. Des. 290,181. This application Feb. 25, 1987, Ser. No. 18,971
Term of patent 14 years
U.S. Cl. D2—312

292,785
FLOATING BOAT TRAILER
Robert A. Warren, P.O. Box 273, Hilltop, W. Va. 25855
Filed Apr. 22, 1985, Ser. No. 725,783
Term of patent 14 years
U.S. Cl. D12—101

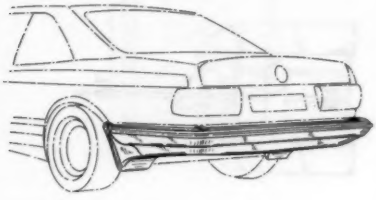




292,786
TIRE
Jan G. J. Schoonhoven, Kerklaan 25, Rozendaal(Gld.), Netherlands
Filed Nov. 27, 1984, Ser. No. 675,228
Claims priority, application World Int. Prop. O, May 30, 1984, DMA/000277
Term of patent 14 years
U.S. Cl. D12—147

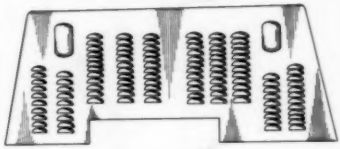
292,787
MOTORCYCLE TIRE
Kazuo Kadomaru, Osaka, Japan, assignor to Sumitomo Rubber Industries, Ltd., Japan
Filed May 2, 1985, Ser. No. 729,863
Claims priority, application Japan, Mar. 12, 1985, 60-11099
Term of patent 14 years
U.S. Cl. D12—147

292,788
REAR SPOILER-BUMPER
Adolf Koch, Waiblingen-Neustadt, Fed. Rep. of Germany, assignor to Sport-Service-Lorinser Sportliche Autoausrüstung GmbH, Waiblingen, Fed. Rep. of Germany
Filed Jan. 10, 1985, Ser. No. 690,575
Claims priority, application Fed. Rep. of Germany, Jul. 24, 1984, 985
Term of patent 14 years
U.S. Cl. D12—181

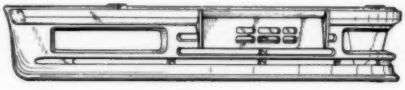


292,789
REAR SPOILER
Adolf Koch, Waiblingen-Neustadt, Fed. Rep. of Germany, assignor to Sport-Service-Lorinser Sportliche Autoausrüstung GmbH, Waiblingen, Fed. Rep. of Germany
Filed Jul. 18, 1985, Ser. No. 756,967
Claims priority, application Fed. Rep. of Germany, Jan. 18, 1985, 1007
Term of patent 14 years
U.S. Cl. D12—181

292,790
DEFLECTOR PLATE FOR THE UNDERBODY OF A SPORTS CAR
Rick L. Schneck, 15189 Marl St., Linden, Mich. 48451
Filed Sep. 13, 1985, Ser. No. 775,605
Term of patent 14 years
U.S. Cl. D12—190



292,791
SPOILER
Adolf Koch, Waiblingen-Neustadt, Fed. Rep. of Germany, assignor to ATG Autoteile-Grosshandel GmbH, Waiblingen, Fed. Rep. of Germany
Continuation of Ser. No. 558,157, Dec. 5, 1983, abandoned. This application Jun. 6, 1986, Ser. No. 872,376
Claims priority, application Fed. Rep. of Germany, Jun. 8, 1983, 948
Term of patent 14 years
U.S. Cl. D12—181



292,792

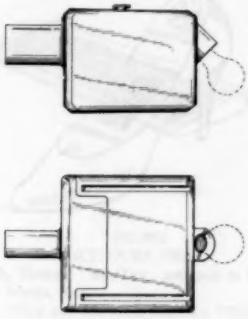
MOTOR HOUSING FOR A GARAGE DOOR OPERATOR

Susanne G. Henry, Chicago, Ill., assignor to Chamberlain Manufacturing Corporation, Elmhurst, Ill.

Filed Jul. 8, 1985, Ser. No. 752,819

Term of patent 14 years

U.S. Cl. D13—2



292,793

LAMP SOCKET OR THE LIKE

Walter B. Reid, III, Airport Rd., P.O. Box 3545, Wilson, N.C. 27893

Filed Apr. 8, 1985, Ser. No. 720,853

Term of patent 14 years

U.S. Cl. D13—25

292,794

EIGHT CONDUCTOR MODULAR PLUG

Stephen M. Thomas, Torrington, and Ronald Nitowski, Naugatuck, both of Conn., assignors to The Siemon Company, Watertown, Conn.

Filed Jul. 26, 1984, Ser. No. 634,830

Term of patent 14 years

U.S. Cl. D13—28

292,795

COMBINED CAR RADIO AND CASSETTE PLAYER

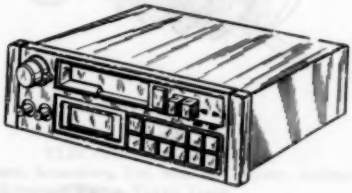
Frank H. C. Newman, Singapore, Singapore, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 16, 1985, Ser. No. 776,325

Claims priority, application United Kingdom, Mar. 20, 1985, 1025683

Term of patent 14 years

U.S. Cl. D14—5



292,796

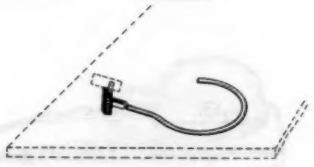
MICROPHONE SUPPORT

Maurice I. Rosenthal, 8900 Alto Cedro, Beverly Hills, Calif. 90210

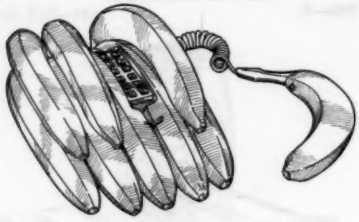
Filed Mar. 8, 1985, Ser. No. 709,933

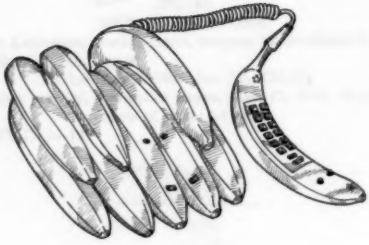
Term of patent 14 years

U.S. Cl. D14—13

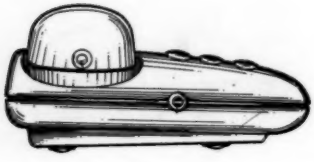


292,797
TELEPHONE SET
Charles R. McNeil, II, 1684 Kramer St., NE., Washington, D.C. 20002
Filed May 15, 1986, Ser. No. 863,473
Term of patent 14 years
U.S. Cl. D14—53



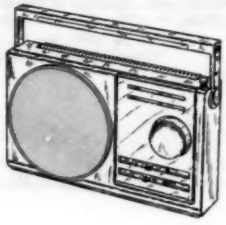


292,798
TELEPHONE SET
Richard Wu, 12F., 126, Sec. 4 Nanking E. Rd., Taipei, Taiwan
Filed Apr. 8, 1986, Ser. No. 850,894
Term of patent 14 years
U.S. Cl. D14—53



292,799
TELEPHONE
Dominic Falcone, 283 Creek Rd., Doylestown, Pa. 18901
Filed Apr. 28, 1986, Ser. No. 858,245
Term of patent 14 years
U.S. Cl. D14—64

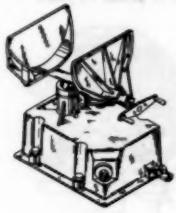
292,800
PORTABLE RADIO RECEIVER
Grant M. N. Davidson, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Apr. 22, 1985, Ser. No. 725,973
Claims priority, application United Kingdom, Oct. 31, 1984, 1022995
Term of patent 14 years
U.S. Cl. D14—70



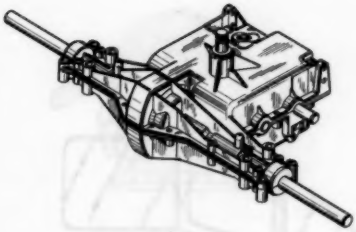
292,801
KEYBOARD FOR A COMPUTER
Myron F. Davis, Jr., and Ted F. Kelley, Jr., both of Boca Raton, Fla., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Mar. 18, 1985, Ser. No. 711,460
Term of patent 14 years
U.S. Cl. D14—100

292,802
ICE CUBE TRAY
Earl B. Fails, Haltom City, Tex., assignor to U. S. Works-86, Inc., Fort Worth, Tex.
Filed Jul. 23, 1985, Ser. No. 758,052
Term of patent 14 years
U.S. Cl. D15—90

292,803
PAINT CAN SHAKER
Patrick W. Powell, Castle Rock, Colo., assignor to Broncorp Manufacturing Company, Inc., Lakewood, Colo.
Filed May 10, 1985, Ser. No. 733,508
Term of patent 14 years
U.S. Cl. D15—147

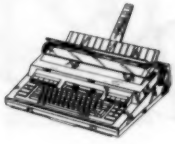


292,804
TRANSAXLE
Douglas F. Edwards, Mt. Vernon, Ohio, assignor to The J. B. Foote Foundry Co., Fredericktown, Ohio
Filed Jan. 16, 1985, Ser. No. 692,649
Term of patent 14 years
U.S. Cl. D15—149

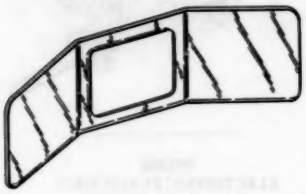


292,805
ELECTRONIC FLASH UNIT
Luigi Colani, Sassenberg, Fed. Rep. of Germany, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Mar. 5, 1985, Ser. No. 708,542
Claims priority, application Japan, Oct. 5, 1984, 59-41616
Term of patent 14 years
U.S. Cl. D16—42

292,806
ELECTRONIC TYPEWRITER
Seiichi Omino, Tokyo, and Toshiaki Itazawa, Ichikawa, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Jun. 17, 1985, Ser. No. 745,223
Claims priority, application Japan, Dec. 20, 1984, 59-52574
Term of patent 14 years
U.S. Cl. D18—1

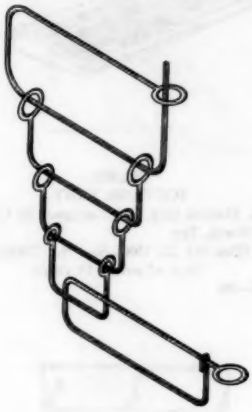


292,807
COPYHOLDER
Andres H. Visnapuu, 2965 Scarborough, Cleveland Heights, Ohio 44118
Filed May 3, 1984, Ser. No. 606,693
Term of patent 14 years
U.S. Cl. D19—91



292,808
BALANCE TOY
Wayne Dyer, 49875 Willow Rd., Belleville, Mich. 48111
Filed Apr. 22, 1985, Ser. No. 725,772
Term of patent 14 years
U.S. Cl. D21—102

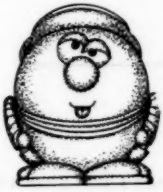
292,809
WIRE PUZZLE
Walter G. Koosman, 10222 Revere La., Maple Grove, Minn. 55369
Filed Feb. 25, 1985, Ser. No. 705,379
Term of patent 14 years
U.S. Cl. D21—106



292,810
DOLL
Henri Klemans, Onderbergen 54, Ghent, Belgium
Filed May 20, 1985, Ser. No. 735,786
Claims priority, application Belgium, Nov. 26, 1984, WOX Int. Prop. O. DM/004461
Term of patent 14 years
U.S. Cl. D21—148

292,811
FINGER PUPPET OR SIMILAR ARTICLE
A. Edward Fogarty; Bonnie R. Fogarty, both of Sarasota, Fla., and Sabrina M. Danna, West Warick, R.I., assignors to Hasbro-Bradley, Inc., Pawtucket, R.I.
Filed Apr. 29, 1985, Ser. No. 728,514
Term of patent 14 years
U.S. Cl. D21—153

292,812
TOY FIGURE
Bonnie Zacherle, Norwood, Mass., assignor to Kenner Parker Toys Inc., Beverly, Mass.
Filed Jun. 26, 1985, Ser. No. 748,791
Term of patent 14 years
U.S. Cl. D21—171



292,813
TOY FIGURE
Bonnie Zacherle, Norwood, Mass., assignor to Kenner Parker Toys Inc., Beverly, Mass.
Filed Jun. 26, 1985, Ser. No. 748,800
Term of patent 14 years
U.S. Cl. D21—171

292,814
TOY FIGURE
Bonnie Zacherle, Norwood, Mass., assignor to Kenner Parker Toys Inc., Beverly, Mass.
Filed Jun. 26, 1985, Ser. No. 748,801
Term of patent 14 years
U.S. Cl. D21—171

292,815
TOY FIGURE
Bonnie Zacherle, Norwood, Mass., assignor to Kenner Parker Toys Inc., Beverly, Mass.
Filed Jun. 26, 1985, Ser. No. 748,887
Term of patent 14 years
U.S. Cl. D21—177

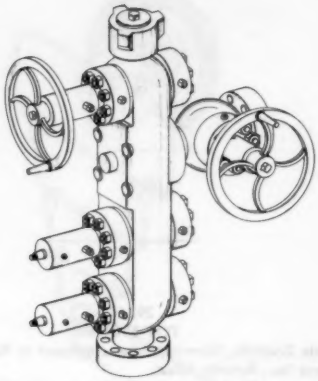
292,816
TOY FIGURE
Bonnie Zacherle, Norwood, Mass., assignor to Kenner Parker Toys Inc., Beverly, Mass.
Filed Jun. 26, 1985, Ser. No. 748,891
Term of patent 14 years
U.S. Cl. D21—171

292,817
TOY FIGURE
Bonnie Zacherle, Norwood, Mass., assignor to Kenner Parker Toys Inc., Beverly, Mass.
Filed Jun. 26, 1985, Ser. No. 749,040
Term of patent 14 years
U.S. Cl. D21—171

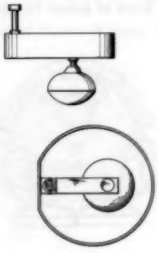
292,818
TOY FIGURE
Bonnie Zacherle, Norwood, Mass., assignor to Kenner Parker Toys Inc., Beverly, Mass.
Filed Jun. 26, 1985, Ser. No. 748,797
Term of patent 14 years
U.S. Cl. D21—178

292,819
TOY STICK FOR ROLLING A DISC
Sammy W. Whatley, #1 El Paso Dr., Houma, La. 70360
Filed May 29, 1985, Ser. No. 739,088
Term of patent 14 years
U.S. Cl. D21—210

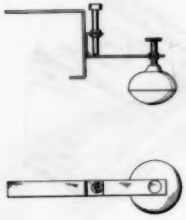
292,820
GATE VALVE
Willard E. Kemp, 14702 Broadgreen, Houston, Tex. 77079
Filed Sep. 2, 1983, Ser. No. 528,747
Term of patent years
U.S. Cl. D23—244



292,821
LIQUID LEVEL CONTROL VALVE
Ilias Tsolkas, 2813 Longview Dr., Clearwater, Fla. 33519
Filed Jul. 31, 1985, Ser. No. 760,964
Term of patent 14 years
U.S. Cl. D23—236

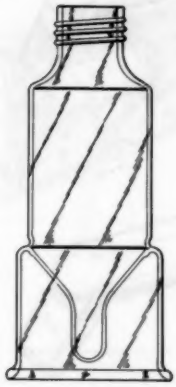


292,822
LIQUID LEVEL CONTROL VALUE
Ilias Tsolkas, 2813 Longview Dr., Clearwater, Fla. 33519
Filed Jul. 31, 1985, Ser. No. 760,965
Term of patent 14 years
U.S. Cl. D23—236

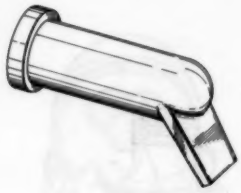


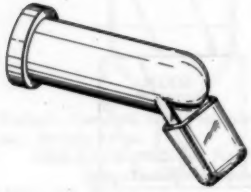
292,823
HOUSING FOR A FAN
Joseph St. Clair, 103 Auction Barn Rd., Belton, Tex. 76513
Filed Jul. 12, 1985, Ser. No. 754,081
Term of patent 14 years
U.S. Cl. D23—382

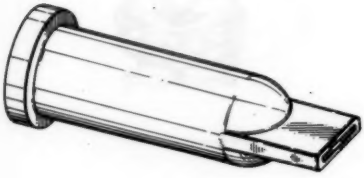
292,824
RESERVOIR FOR SOLVENT DELIVERY
John F. Babashak, Falls Church, Va., assignor to Kontes Glass Company, Vineland, N.J.
Filed Mar. 14, 1985, Ser. No. 711,560
Term of patent 14 years
U.S. Cl. D24—8

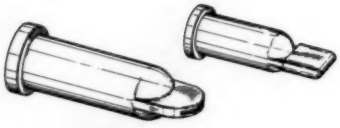


292,825
DENTAL TIP
William B. Dragan, 85 Burr St., Easton, Conn. 06612
Filed Oct. 30, 1985, Ser. No. 792,802
Term of patent 14 years
U.S. Cl. D24—16

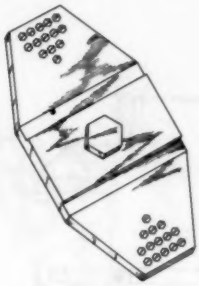






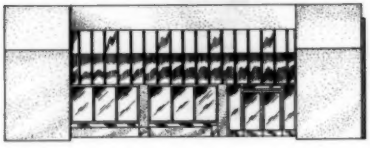


292,826
MEDICINE DISPENSING BANDAGE
Ronnie R. Sproles, 19410 Wallace Rd., Strathmore, Calif. 93267
Filed Aug. 16, 1984, Ser. No. 641,501
Term of patent 14 years
U.S. Cl. D24—49

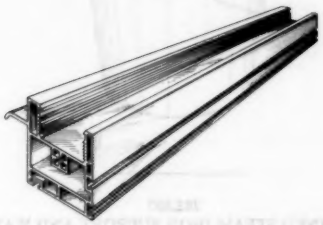


292,827
COMBINED EVACUATED BLOOD SAMPLING TUBE AND SEDIMENTATION RATE COLUMN
Karl Fele, Varberg, Sweden, assignor to Biolabimex AB, Varberg, Sweden
Filed May 15, 1985, Ser. No. 734,476
Claims priority, application Sweden, Nov. 26, 1984, 3136/84
Term of patent 14 years
U.S. Cl. D24—51

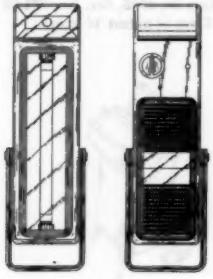
292,828
BUILDING STRUCTURE
Jerry A. Fisher, Kettering; Ronald J. Leach, Springfield; Hugh R. Patterson, Vandalia, and Gary J. Yoko, Englewood, all of Ohio, assignors to Ponderosa, Inc., Vandalia, Ohio
Filed Jan. 7, 1985, Ser. No. 689,430
Term of patent 14 years
U.S. Cl. D25—17



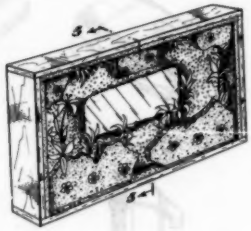
292,829
DESIGN FOR A WINDOW COMPONENT EXTRUSION
Ludwig Reisinger, McPherson, and Dennis Westphal, Galva, both of Kans., assignors to CertainTeed Corporation, Valley Forge, Pa.
Filed Oct. 24, 1984, Ser. No. 664,311
The portion of the term of this patent subsequent to Nov. 10, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D25—124



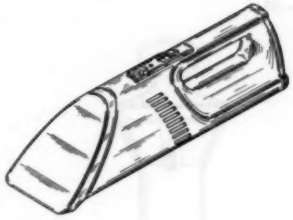
292,830
COMBINED MULTI-PURPOSE LANTERN WITH ADJUSTABLE BEAM AND ADJUSTABLE STAND THEREFOR
John S. Yuen, Kowloon, Hong Kong, assignor to John Manufacturing Limited, Kowloon, Hong Kong
Filed Oct. 22, 1984, Ser. No. 663,716
Claims priority, application United Kingdom, May 11, 1984, 1 019 579
Term of patent 14 years
U.S. Cl. D26—42



292,831
AQUARIUM BACKING UNIT
George J. Kozy, and James T. Brockman, both of 601 S. Euclid, La Habra, Calif. 90631
Filed Dec. 6, 1985, Ser. No. 805,553
Term of patent 14 years
U.S. Cl. D30—106



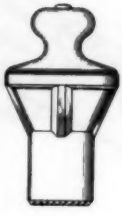
292,832
VACUUM CLEANER
Sachio Yamamoto, and Akira Tsukada, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Jan. 23, 1985, Ser. No. 693,792
Claims priority, application Japan, Jul. 23, 1984, 59-31119
Term of patent 14 years
U.S. Cl. D32—18



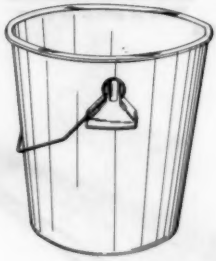
292,833
VACUUM CLEANER
Gerhard Busalt, Biblis, Fed. Rep. of Germany, assignor to Rowenta-Werke GmbH, Offenbach am Main, Fed. Rep. of Germany
Filed Feb. 4, 1985, Ser. No. 697,809
Claims priority, application Fed. Rep. of Germany, Aug. 21, 1984, 5 MR 10 552
Term of patent 14 years
U.S. Cl. D32—24

292,834
ELECTRIC DRILL ATTACHMENT FOR MOUNTING CLEANING PAD OR THE LIKE
Nancy Slachta, 4913 Ash St., 2nd Floor, Hammond, Ind. 46320
Filed May 29, 1985, Ser. No. 739,054
Term of patent 14 years
U.S. Cl. D32—25

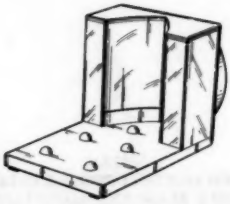
292,835
GARBAGE PUSHER OR THE LIKE
John F. Schaber, 10320 SW. Coquille Dr., Tualatin, Oreg. 97062
Filed May 24, 1985, Ser. No. 737,653
Term of patent 14 years
U.S. Cl. D32—35



292,836
BUCKET
David A. Juergens, Winchester, Va., assignor to Rubbermaid Commercial Products Inc., Winchester, Va.
Filed Aug. 25, 1986, Ser. No. 900,104
Term of patent 14 years
U.S. Cl. D32—53



292,837
COMBINED STEAM IRON SUPPORT AND WATER TANK
Cavalli Alfredo, Pessano con Bornago, Italy; Cesarina Flippi, heir; Massimo F. Cavalli, heir, and Silvia Cavalli, heir, all of Via Galileo Galilei, 9, Pessano con Bornago (Milan), Italy
Filed Jul. 12, 1985, Ser. No. 754,114
Claims priority, application Italy, Jan. 15, 1985, 20522 B/85
Term of patent 14 years
U.S. Cl. D32—73



292,838
TRANSPORTABLE CART
Richard Le Sage, Redwood Falls; Eugene N. Reshanov, Golden Valley, and Richard A. Schlemmer, Redwood Falls, all of Minn., assignors to G. S. Blodgett Co., Inc., Burlington, Vt.
Filed Aug. 30, 1985, Ser. No. 771,007
Term of patent 14 years
U.S. Cl. D34—25

292,839

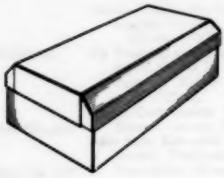
PET CASKET

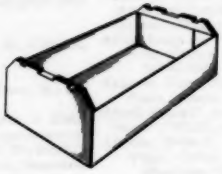
Roy E. Brogdon, Gainesville Hwy., Cleveland, Ga. 30528

Filed Feb. 28, 1985, Ser. No. 706,655

Term of patent 14 years

U.S. Cl. D99—1





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TO WHOM

PATENTS WERE ISSUED ON THE 17TH DAY OF NOVEMBER, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. O. Smith Corporation: *See*—
Houle, Timothy H., 4,707,313, Cl. 264-61.000.

AB Asea-Atom: *See*—
Arbink, Richard; and Nylund, Olov, 4,707,328, Cl. 376-446.000.

AB Electrolux: *See*—
Andreasson, Bo C., 4,706,640, Cl. 123-651.000.

AB Volvo: *See*—
Torgardh, Ralph, 4,707,000, Cl. 285-305.000.

Abe, Hiraku; Uehara, Minoru; and Aikawa, Chiaki, to Alps Electric Co., Ltd. Star-shaped coupler. 4,707,062, Cl. 350-96.160.

Abe, Takao: *See*—
Inaba, Yoshihiro; Koshizuka, Kunihiro; Maehashi, Tatsuichi; and Abe, Takao, 4,707,406, Cl. 428-336.000.

Abrams, Martin L.: *See*—
Taylor, William A.; and Abrams, Martin L., 4,706,737, Cl. 165-47.000.

Abrams, Michael J.: *See*—
Jones, Alun G.; Davison, Alan; and Abrams, Michael J., 4,707,544, Cl. 534-14.000.

Abu-Shumays, Ibrahim K.; and Abu-Shumays, Mary D. Regular polyhedron puzzles. 4,706,956, Cl. 273-153.00S.

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Abu-Shumays, Ibrahim K.; and Abu-Shumays, Mary D., 4,706,956, Cl. 273-153.00S.

Acco Babcock Inc.: *See*—
Moro, Dominik J.; Reisinger, Robert R.; Larson, James M.; and Kuhn, Roscoe E., 4,706,570, Cl. 105-163.200.

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Adachi, Mitsunori; and Tomita, Satoru, to Mitsubishi Kenki Kabushiki Kaisha. Band compression apparatus for a video signal. 4,707,737, Cl. 358-133.000.

Adachi, Toshio; Aoyagi, Toru; Kawaguchi, Akihisa; and Yamanaka, Shigeki, to Ohbayashi-Gumi, Ltd. Openable dome-shaped roof structure. 4,706,419, Cl. 52-65.000.

Adams, William R.: *See*—
Baldasarri, Mario; Adams, William R.; and Caspers, John, 4,707,245, Cl. 208-57.000.

Adeka Argus Chemical Co., Ltd.: *See*—
Akutsu, Mitsuo; and Kanai, Mitsuharu, 4,707,507, Cl. 524-99.000.

Adil, Mehmet Nazim: *See*—
Hegedus, Leslie J.; and Bentall, Simon W., 4,706,851, Cl. 222-106.000.

ADT, Inc.: *See*—
Guscott, John K., 4,707,604, Cl. 250-342.000.

Advanced Color Technology, Inc.: *See*—
Allen, David; and Cleary, Arthur, 4,707,704, Cl. 346-24.000.
Buckley, Dennis J.; Cleary, Arthur; and Winey, Calvin, 4,707,712, Cl. 346-136.000.

Advanced Micro Devices, Inc.: *See*—
Erb, Darrell M., 4,707,457, Cl. 437-193.000.
Thomas, Mammen; and Weinberg, Matthew, 4,707,456, Cl. 437-59.000.

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Briggs, Randal L., 4,707,797, Cl. 364-607.000.

AE PLC: *See*—
Eastwood, Barry J., 4,707,194, Cl. 148-11.50A.

Aellen, Pierre-Andre ; and Gagnebin, Gaston, to Omega SA. Watch bracelet the elements of which are maintained assembled by means of two flexible ties. 4,706,857, Cl. 224-164.000.

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Tauber, Thomas E.; and Horan, James L., 4,707,165, Cl. 55-204.000.

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Ebata, Yoshihiro; Hayami, Ryozo; Tamari, Nobuyuki; Toibana, Yasuo; and Kinoshita, Makoto, 4,707,416, Cl. 428-627.000.

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Durham, Robert L., 4,707,176, Cl. 71-23.000.

Ahlstrand, Ove, to Mo och Domsjo AB. Method and an arrangement for producing a fibre layer. 4,706,340, Cl. 19-296.000.

Ahmad, Syed I.; and Hedaya, Eddie, to Technicon Instruments Corp. Binding assays in automated apparatus with liposome compatible surfactants. 4,707,441, Cl. 435-7.000.

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Abe, Hiraku; Uehara, Minoru; and Aikawa, Chiaki, 4,707,062, Cl. 350-96.160.

Aikawa, Hiroyasu: *See*—
Inagaki, Tetsuya; Aoki, Hidemi; Aikawa, Hiroyasu; and Takahashi, Masao, 4,707,472, Cl. 514-58.000.

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Ayres, Calvin L.; and Rowles, Howard C., 4,707,170, Cl. 62-24.000.
Petrella, Robert G.; and Scarpati, Michael, 4,707,501, Cl. 521-115.000.

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Harper, George S., 4,707,674, Cl. 335-13.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Inagaki, Toshiyuki; and Maeda, Hiroaki, 4,706,549, Cl. 91-448.000.
Tsunekawa, Masaru; Naito, Yoshihiro; Hyodo, Masaya; and Hayashi, Tatsuya, 4,706,457, Cl. 60-521.000.

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Ajami, Alfred M., to Tracer Technologies, Inc. Electrochemical dehalogenation of organic compounds. 4,707,230, Cl. 204-131.000.

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Akazawa, Naoki; Nishi, Kazuhiko; Kawakami, Naoya; Fujisawa, Yoshiaki; and Yamada, Noriyoshi, to Sawafuji Electric Co., Ltd. System for controlling compressor operation. 4,706,470, Cl. 62-209.000.

Akiba, Kouji: *See*—
Arai, Yoshio; Kitajima, Akira; and Akiba, Kouji, 4,706,760, Cl. 169-61.000.

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Endo, Azuchi; and Akimoto, Taizo, 4,707,739, Cl. 358-139.000.

Aklufi, Monti E., to United States of America, Navy. Single crystal thin films. 4,707,217, Cl. 156-617.00R.

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Akre, Collin A., to Northern Telecom Limited. Apparatus for assembling optical fibers onto a support filament. 4,706,449, Cl. 57-6.000.

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Asai, Masahiro; Mizushima, Toshio; Kawai, Toshiro; Akutsu, Shigemitsu; and Uozumi, Yoshiaki, 4,706,617, Cl. 123-65.0PE.

Akutsu, Yoshinori: *See*—
Nagai, Yoichiro; Watanabe, Hamao; and Akutsu, Yoshinori, 4,707,557, Cl. 556-430.000.

Alard, Michel, to Etat Francais represente par le secretaire d'Etat Aux Postes et Telecommunications et a la Telediffusion (Centre National d'Etudes des Telecommunications); and Etablissement Public de Diffusion dit"Telediffusion de France". Sync extraction for a broadcasting system with time multiplexing of digital and analog signals. 4,707,730, Cl. 358-13.000.

Alber, Carl H.; and Alber, Glenn, to Alber Engineering, Inc. Battery testing and monitoring system. 4,707,795, Cl. 364-550.000.

Alber Engineering, Inc.: *See*—
Alber, Carl H.; and Alber, Glenn, 4,707,795, Cl. 364-550.000.

Alber, Glenn: *See*—
Alber, Carl H.; and Alber, Glenn, 4,707,795, Cl. 364-550.000.

Albert Denis S.A.: *See*—
Debeaud, Pierre, 4,707,310, Cl. 264-40.600.

Alcon Instrumentation, Inc.: *See*—
Rogers, Wayne W., 4,706,687, Cl. 128-752.000.

Alden, John W.: *See*—
Hailey, Samuel I.; and Alden, John W., 4,707,212, Cl. 156-361.000.

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Alexander, Louis E. Solar chimney. 4,706,471, Cl. 62-235.100.

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Bolmstedt, Ulf; and Lundblad, Bengt, 4,706,741, Cl. 165-115.000.

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Jonak, Vladimir, 4,706,504, Cl. 73-861.580.

Allan, Bernard D.: *See*—
Atkinson, Peter; and Allan, Bernard D., 4,706,501, Cl. 73-730.000.

Allen, David; and Cleary, Arthur, to Advanced Color Technology, Inc. Control system and method for handling sheet materials. 4,707,704, Cl. 346-24.000.

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Hammerle, Frederick A.; Allen, Philip M.; Geddes, Richard; and Malone, Gary R., 4,706,868, Cl. 227-149.000.

Allen-Stevens Drum Accessories Corp.: *See*—
Greck, Eugene, 4,706,836, Cl. 220-256.000.

Allied Corporation: *See*—
Mathew, Chempolil T.; and Ulmer, Harry E., 4,707,294, Cl. 252-182.000.

Sherman, William E., II, 4,707,320, Cl. 264-242.000.
Allos, Janan E., to Sollatek Limited. Mains protection device. 4,707,760, Cl. 361-90.000.
Alpen Tau, Inc.: *See*—
Garlen, David; Koehn, Hilde R.; Koehn, Peter W.; and McColl, J. D., 4,707,354, Cl. 424-47.000.
Alps Electric Co., Ltd.: *See*—
Abe, Hiraku; Uehara, Minoru; and Aikawa, Chiaki, 4,707,062, Cl. 350-96.160.
Hori, Fumihisa, 4,706,562, Cl. 101-93.220.
Alsthom: *See*—
Nithart, Henri; and Graftiaux, Robert, 4,707,214, Cl. 156-392.000.
Alternative Energy Resources: *See*—
Matzkanin, Randy L., 4,706,650, Cl. 126-450.000.
Altieri, Patricia: *See*—
Zollinger, Wendell D.; Boslego, John; Moran, Ellen; Brandt, Brenda; Collins, Hugh; Mandrell, Robert; Altieri, Patricia; and Berman, Sanford, 4,707,543, Cl. 530-402.000.
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Cotter, Donald P., 4,706,434, Cl. 52-520.000.
Amari, Mitsuhiro: *See*—
Nishi, Tomoya; Amari, Mitsuhiro; and Suzuki, Kenji, 4,707,153, Cl. 400-121.000.
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Donhauser, Friedrich; Schoengen, Anton; Schroeder, Johann H.; and Porschen, Jorg, 4,707,274, Cl. 210-774.000.
Amchem Products: *See*—
Halterman, Diane; and Henley, Thomas, 4,707,273, Cl. 210-724.000.
Amdahl Corporation: *See*—
Lee, Hsiao-Peng S.; Rawlinson, Stephen J.; and Si, Stephen S. C., 4,707,783, Cl. 364-200.000.
American Coin Currency Equipment Corporation: *See*—
McDonald, Ronald; and Hengeveld, John A., 4,707,843, Cl. 377-8.000.
American Home Products Corporation: *See*—
Curtis, H. Edward; and Gaffney, Thomas J., 4,706,815, Cl. 206-531.000.
American Meter Company: *See*—
Hicks, Irwin A., 4,706,496, Cl. 73-268.000.
American Safety Razor Company: *See*—
Iten, Clemens A., 4,706,385, Cl. 30-169.000.
American Standard Inc.: *See*—
Magliano, Silvio, 4,706,791, Cl. 192-8.00R.
Monch, Heiner, 4,706,709, Cl. 137-597.000.
American Sterilizer Company: *See*—
Houston, John C., 4,706,511, Cl. 74-105.000.
American Telephone and Telegraph Company: *See*—
Bauer, David L.; Bowyer, Larry D.; Ruby, David M.; and Windhausen, Richard A., 4,707,694, Cl. 340-825.520.
American Telephone and Telegraph Company, AT&T Bell Laboratories: *See*—
Chen, Chung Y., 4,707,219, Cl. 156-644.000.
Geary, John M., 4,707,078, Cl. 350-332.000.
Hensel, John C.; Levi, Anthony F. J.; and Tung, Raymond T., 4,707,197, Cl. 437-189.000.
Johnson, David W., Jr.; MacChesney, John B.; Rabinovich, Eliezer M.; and Vogel, Eva M., 4,707,174, Cl. 65-18.100.
American Telephone & Telegraph Company, AT&T Information Systems Inc.: *See*—
DiPiazza, Philip S.; Lynn, Dale E.; and Weber, Donald J., 4,707,689, Cl. 340-706.000.
Amitani, Joji: *See*—
Sorimachi, Kanehiro; and Amitani, Joji, 4,707,642, Cl. 318-37.000.
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Amoco Corporation: *See*—
Beaton, William I.; Hensley, Albert L.; and Evans, April J., 4,707,466, Cl. 502-313.000.
Harrington, John P., 4,706,757, Cl. 166-349.000.
AMP Incorporated: *See*—
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Gliha, Edward R., 4,707,049, Cl. 439-620.000.
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Brokaw, Adrian P.; and Maidique, Modesto A., 4,707,682, Cl. 340-347.0AD.
Anders, John B.: *See*—
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Anthony, Bruce O., Jr.; Heise, Thomas M.; and Sheppard, Frank P., to International Business Machines Corporation. Emulator for computer system input-output adapters. 4,707,803, Cl. 364-900.000.
Anthony, Dennis R. Ultraviolet method for making optical composites. 4,707,091, Cl. 352-47.000.
Anze, Kimio: *See*—
Tajima, Shoji; Kadomatsu, Yasuo; Miyazaki, Yoshio; Sakurai, Michikazu; and Anze, Kimio, 4,707,382, Cl. 427-58.000.
Aoki Corporation: *See*—
Saito, Kenichiro; Kanaoka, Chikao; and Aoyama, Shigeyuki, 4,707,167, Cl. 55-267.000.
Aoki, Hidemi: *See*—
Inagaki, Tetsuya; Aoki, Hidemi; Aikawa, Hiroyasu; and Takahashi, Masao, 4,707,472, Cl. 514-58.000.
Aoki, Hisashi: *See*—
Itoh, Kunio; Okada, Fumio; Yamamoto, Yasushi; and Aoki, Hisashi, 4,707,503, Cl. 522-99.000.
Aoki, Minoru, to Ricoh Company, Ltd. Method of automatically adjusting image density in image forming device. 4,707,114, Cl. 355-14.00D.
Aoki, Takashi: *See*—
Nishikawa, Masao; Aoki, Takashi; and Sakurai, Yoshimi, 4,706,523, Cl. 74-869.000.
Aoki, Yoshiaki; Kayukawa, Naoyuki; Yamazaki, Hatsuo; Ozawa, Yasutomo; and Kitagawa, Hiroki, to Hokkaido University. Device for measuring plasma properties. 4,707,147, Cl. 374-161.000.
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Apeland, Ivar. Sand classification tank. 4,707,249, Cl. 209-156.000.
Apple Computer, Inc.: *See*—
Patel, Shailesh; and Dirks, Wolfgang, 4,707,754, Cl. 360-106.000.
Applied Technologies Associates: *See*—
Van Steenwyk, Donald H., 4,706,388, Cl. 33-304.000.
Aprica Kassai Kabushikikaisha: *See*—
Kassai, Kenzou, 4,706,986, Cl. 280-642.000.
Arachnid, Inc.: *See*—
Michalski, David E., 4,706,962, Cl. 273-347.000.
Arai, Kenichiro, to Seiko Epson Kabushiki Kaisha. Printer. 4,707,154, Cl. 400-185.000.
Arai, Masashi: *See*—
Tanaka, Kanji; and Arai, Masashi, 4,707,856, Cl. 381-15.000.
Arai, Yoshio; Kitajima, Akira; and Akiba, Kouji, to Hochiki Kabushiki Kaisha. Fire extinguishing condition monitoring apparatus for automatic fire extinguishing equipment. 4,706,760, Cl. 169-61.000.
Arakawa, Kazuhiko; Harada, Yoshihito; Kiuchi, Masayoshi; Tokura, Go; and Fujibayashi, Kazuo, to Canon Kabushiki Kaisha. Film frame number display device for camera. 4,707,097, Cl. 354-217.000.

Arakawa, Mitsuaki: *See*—
Fehn, John H.; Arakawa, Mitsuaki; and McCarten, Barry M., 4,707,664, Cl. 324-322.000.
Arakawa, Yoshihiro: *See*—
Yoshino, Hiroshi; Tsuchiya, Yutaka; Kaneko, Takeru; Nakazawa, Takahiro; Ikeda, Masuhiro; Araki, Shin; Yamatsu, Kiyomi; Tachibana, Shinro; and Arakawa, Yoshihiro, 4,707,468, Cl. 514-16.000.
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Kakizaki, Takehiro; Araki, Shoji; and Numata, Shinichi, 4,707,634, Cl. 313-432.000.
Arbink, Richard; and Nylund, Olov, to AB Asea-Atom. Fuel assembly for a nuclear reactor. 4,707,328, Cl. 376-446.000.
Arena, Christopher L.; and Prior, Robert L. Disabled shopping cart attachment. 4,706,975, Cl. 280-33.99A.
Argus Chemical Corporation: *See*—
Fisch, Michael H.; Hegranes, Barbara A.; and Seubert, George A., Jr., 4,707,509, Cl. 524-147.000.
Aristech Chemical Corporation: *See*—
Ehrig, Raymond J.; and Weil, Richard C., 4,707,524, Cl. 525-387.000.
Arita, Setsuo; and Sato, Takao, to Hitachi, Ltd. Multiplex control apparatus having middle value selection circuit. 4,707,621, Cl. 307-441.000.
Armstrong World Industries, Inc.: *See*—
Tymon, Thomas M., 4,707,298, Cl. 252-378.00R.
Arrang, Jean-Michel; Garbarg, Monique; Lancelot, Jean-Charles; Lecomte, Jeanne-Marie; Robba, Max-Fernand; and Schwartz, Jean-Charles, to Institut National de la Sante et de la Recherche Medicale (Inserm); Universite de Caen; and Societe Civile Bioprojet. (4-imidazolyl)piperidines, the preparation thereof and their application in therapy. 4,707,487, Cl. 514-326.000.
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Knispel, Barry; and Wingert, Rudolf, 4,706,869, Cl. 227-156.000.
Asahi Kasei Kogyo Kabushiki Kaisha: *See*—
Ohue, Kazuto; Kondou, Toshiyuki; Takeuchi, Hisaharu; and Ikeda, Yuzo, 4,707,269, Cl. 210-651.000.
Asahi Kogaku Kogyo Kabushiki Kaisha: *See*—
Itoh, Takayuki, 4,707,082, Cl. 350-425.000.
Asai, Masahiro; Mizushima, Toshio; Kawai, Toshiro; Akutsu, Shigemitsu; and Uozumi, Yoshiaki, to Honda Giken Kogyo Kabushiki Kaisha. Two-cycle engine. 4,706,617, Cl. 123-65.0PE.
Asakura, Masahiko; Kawanabe, Tomohiko; Kushida, Noritaka; and Hasebe, Hiroshi, to Honda Giken Kogyo Kabushiki Kaisha. Oxygen concentration sensing device for an air-fuel ratio control system of an automotive internal combustion engine. 4,706,637, Cl. 123-589.000.
Asher, Reginald K.: *See*—
Folk, Lee E.; and Asher, Reginald K., 4,707,722, Cl. 357-67.000.
Ashland Oil, Inc.: *See*—
Goel, Anil B., 4,707,532, Cl. 528-45.000.
Ashton, Geoffrey B. Space divider. 4,706,422, Cl. 52-145.000.
Aso, Koichi: *See*—
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Aso, Toshiyuki; and Kinoshita, Hiroshi, to Fanuc Ltd. Wire-cut electrical discharge machine. 4,707,580, Cl. 219-69.00W.
Aspera S.r.l.: *See*—
Zgliczynski, Marek; and Sesona, Giancarlo, 4,706,353, Cl. 29-156.40R.
Astec Industries, Inc.: *See*—
Brock, James D., 4,706,893, Cl. 241-23.000.
Astheimer, Robert W.; and Kelly, William J., to Barnes Engineering Company. Method and apparatus for thermal examination of a target by selective sampling. 4,707,605, Cl. 250-347.000.
Astner, Gunnar; and Sjostrom, Sten-Ove, to SKF Steel Engineering AB. Connection device for plasma generators. 4,706,943, Cl. 266-265.000.
AT&T Information Systems Inc.: *See*—
Bauer, David L.; Bowyer, Larry D.; Ruby, David M.; and Windhausen, Richard A., 4,707,694, Cl. 340-825.520.
Ateliers de Decoupage, Emboutissage et Mecanique de la Vallee de l'Arve ADEMVA, Societe Anonyme: *See*—
Lavorel, Gerard, 4,706,369, Cl. 29-560.000.
Atkinson, Peter; and Allan, Bernard D., to Imperial Chemical Industries PLC. Detection of step charges of pressure in vessels and apparatus therefor. 4,706,501, Cl. 73-730.000.
Atlantic Richfield Company: *See*—
Martinez, David R., 4,707,812, Cl. 367-46.000.
Smith, Lonnie J.; Petermann, Steven G.; and Wood, Dennis R., 4,706,744, Cl. 166-65.100.
Atsugi Motor Parts Company Limited: *See*—
Komatsu, Shinichi, 4,706,513, Cl. 74-422.000.
Aubry, Jacques, to Societe Nationale Industrielle Aerospatiale. Process for connecting an element to one end of a tube of composite material and device thus obtained. 4,706,364, Cl. 29-458.000.
Auel, RaeAnn M.: *See*—
Schneider, Alan A.; Stewart, David A.; Jolson, Joseph D.; Auel, RaeAnn M.; and Price, John F., 4,707,242, Cl. 204-412.000.
Awane, Misao; Hara, Seiji; and Kobayashi, Satoshi, to Sanyo Electric Co., Ltd. Vending machine with a common display. 4,706,794, Cl. 194-217.000.
Ayata, Naoki; Saito, Seiji; Suzuki, Hidetoshi; Ozawa, Kunitaka; and Koumura, Noboru, to Canon Kabushiki Kaisha. Image recording apparatus. 4,707,713, Cl. 346-140.00R.
Ayers, Sammy L., Jr.: *See*—
Pasinski, Ralph R.; Ayers, Sammy L., Jr.; and Kocmond, Warren C., Jr., 4,707,855, Cl. 379-376.000.
Ayres, Calvin L.; and Rowles, Howard C., to Air Products and Chemicals, Inc. Staged multicomponent refrigerant cycle for a process for recovery of C_{3+} hydrocarbons. 4,707,170, Cl. 62-24.000.
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Backer, Robert, 4,706,668, Cl. 128-325.000.
B.C. Clean Wood Preservers Ltd.: *See*—
Silcox, Ronald W., 4,706,722, Cl. 144-329.000.
B. F. Goodrich Company, The: *See*—
Amjad, Zahid; and Masler, William F., III, 4,707,271, Cl. 210-701.000.
Bachmann, Dorian L.: *See*—
Filho, Jorge H.; and Bachmann, Dorian L., 4,707,275, Cl. 210-787.000.
Backe, Bengt S.; and Durham, La Moyne W., to South Bend Lathe, Inc. Method and apparatus for controlling hydraulic systems. 4,706,456, Cl. 60-368.000.
Backer, Robert, to B & B Tools. Aneurysm clip pliers. 4,706,668, Cl. 128-325.000.
Baer, Massimo, to Monsanto Company. Tough thermoplastic nylon compositions. 4,707,513, Cl. 524-504.000.
Baffi, Robert A.: *See*—
Wagner, Daniel B.; and Baffi, Robert A., 4,707,453, Cl. 436-501.000.
Bagheri, Parichehr. Santur. 4,706,539, Cl. 84-284.000.
Bajaj, Ram, to Westinghouse Electric Corp. Method for producing ceramic articles of increased fracture toughness. 4,707,312, Cl. 264-43.000.
Baker, Donal E.; and Beg, Mirza A., to Westinghouse Electric Corp. Master clock system for a parallel variable speed constant frequency power system. 4,707,142, Cl. 368-46.000.
Baker International Corporation: *See*—
Hyll, John, 4,706,928, Cl. 249-184.000.
Balco, Inc.: *See*—
Rumsey, Roger L., 4,706,426, Cl. 52-232.000.
Baldasarri, Mario; Adams, William R.; and Caspers, John, to Lummus Crest, Inc. Temperature control for hydrogenation reactions. 4,707,245, Cl. 208-57.000.
Baldauf, Gunter; and Ott, Helmut, to Herion Werke KG. Two-hand safety control mechanism. 4,706,548, Cl. 91-424.000.
Baldino, Micheal; Voss, Robert L.; and Hladik, Larry L., to Kelly Industries, Inc. Vertical louver system for cooling towers. 4,706,554, Cl. 98-121.200.
Ball, Daniel A., to General Motors Corporation. Retainer assembly. 4,707,768, Cl. 362-66.000.
Ball, Lawrence E.: *See*—
Wu, Mu-Yen M.; Ball, Lawrence E.; and Coffey, Gerald P., 4,707,538, Cl. 528-315.000.
Ballard, Gary W., to Carrier Corporation. Self-correcting microprocessor control system and method for a furnace. 4,706,881, Cl. 236-15.0BD.
Ballard, Gary W.: *See*—
Thompson, Kevin D.; and Ballard, Gary W., 4,707,646, Cl. 318-332.000.
Baltes, Horst: *See*—
Stenz, Karl; and Baltes, Horst, 4,707,033, Cl. 297-452.000.
Bandlish, Baldev K.: *See*—
Roark, David N.; Nugent, Adam, Jr.; and Bandlish, Baldev K., 4,706,755, Cl. 166-295.000.
Bandou, Masaaki; Sugita, Masao; and Marumo, Takachi, to Jidosha Kiki Co., Ltd. Method of manufacturing a valve sleeve. 4,706,487, Cl. 72-355.000.
Barach, Jeffrey T.; and Talbott, Larry L., to Miles Laboratories, Inc. Composition for accelerating cheese aging. 4,707,364, Cl. 426-36.000.
Baran, John S.; and Lowrie, Harman S., to G. D. Searle & Co. 3-alkyl-5-(substituted amino)methyl)dihydro-3-phenyl-2(3H)-furanones and imino analogs thereof used for treatment of arrhythmia. 4,707,499, Cl. 514-471.000.
Barber, John C. Permanently-installed test fitting. 4,706,482, Cl. 73-49.800.
Bares, Jan, to Xerox Corporation. Device for cleaning a charging member. 4,707,115, Cl. 355-15.000.
Barker, David J.: *See*—
Park, George B.; and Barker, David J., 4,707,388, Cl. 428-36.000.
Barnard, William B., to Honeywell Inc. Adaptive optimum start. 4,706,882, Cl. 236-46.00R.
Barnes Engineering Company: *See*—
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Barnes, Johnny G.; Chen, James N.; and Hayes, Gerald E., to International Business Machines Corporation. Word processing system based on a data stream having integrated alphanumeric and graphic data. 4,707,801, Cl. 364-900.000.
Barnes, Robert G., Jr.; and Meyering, Mark T., to Cuno Incorporated. Reinforced microporous membrane. 4,707,265, Cl. 210-638.000.
Barnett, John L. Automobile side protector. 4,707,009, Cl. 293-128.000.

Barone, Patrizia: *See—*
Ramachandran, Pallassana N.; and Barone, Patrizia, 4,707,289, Cl. 252-135.000.

Barrett, David M. Wound closure and observation device having a no-contact protective covering. 4,706,661, Cl. 128-155.000.

Barry Wright Corporation: *See—*
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Bartels, Inske E. H.: *See—*
Tolksdorf, Wolfgang F. M.; Bartels, Inske E. H.; and Pross, Elke B., 4,707,058, Cl. 350-96.120.

Barton, Lewis. Method of forming a filled pouch. 4,706,439, Cl. 53-413.000.

BASF Aktiengesellschaft: *See—*
Fritz, Gerhard; Eggersdorfer, Manfred; and Siegel, Hardo, 4,707,549, Cl. 544-336.000.
Gramlich, Walter; and Siegel, Hardo, 4,707,302, Cl. 512-11.000.
Lotsch, Wolfgang; Bock, Gustav; and Neumann, Peter, 4,707,548, Cl. 544-284.000.
Schneider, Alfred; and Eberhard, Joachim, 4,706,813, Cl. 206-387.000.
Thomas, Michael; Neumann, Peter; Wegerle, Dieter; and Krallmann, Reinhold, 4,707,161, Cl. 8-442.000.

BASF Farben & Fasern AG: *See—*
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Basic, John N., Sr. Pulsating incinerator hearth. 4,706,578, Cl. 110-281.000.

Basselier, Jean-Jacques: *See—*
Clement, Jean-Luc; Lemaire, Michele; Lange, Catherine; Lhommet, Gerard; Celerier, Jean-Pierre; Basselier, Jean-Jacques; and Cassier, Pierre, 4,707,489, Cl. 514-408.000.

Batchelor, Douglas R., to Libman Broom Company. Sponge mop retainer with retraction rod hook receiving catch. 4,706,323, Cl. 15-119.00A.

Bateson, John H.: *See—*
Lord, Leslie W.; Kendall, Kevin; Williams, David T.; and Bateson, John H., 4,707,351, Cl. 423-648.00R.

Batzill, Wolfgang; Dobbelstein, Arnold; Geist, Michael; Schon, Georg; and Ott, Gunther, to BASF Farben & Fasern AG. Alcohol-modified polyepoxides, their preparation and their use in curable mixtures. 4,707,232, Cl. 204-181.700.

Baudequin, Francois; and Leclere, Patrick, to Electricite de France - Service National. Process and device for the decarbonation of minerals by fluidized bed calcination. 4,707,350, Cl. 423-637.000.

Bauduin, Serge: *See—*
Sabater, Jacques; and Bauduin, Serge, 4,707,223, Cl. 162-262.000.

Bauer, David L.; Bowyer, Larry D.; Ruby, David M.; and Windhausen, Richard A., to American Telephone and Telegraph Company; and AT&T Information Systems Inc. Telephone system port communication method and apparatus. 4,707,694, Cl. 340-825.520.

Bauer, Heinz, to Linde Aktiengesellschaft. Process for obtaining C_{2+} or C_{3+} hydrocarbons. 4,707,171, Cl. 62-30.000.

Baugus, Gary; and Oliff, James R., to Mead Corporation, The. Multipack carton with automatic panel positioning tabs. 4,706,814, Cl. 206-427.000.

Baumberg, Iosif. Stethoscope. 4,706,777, Cl. 181-131.000.

Baumer di Mario Gambetti: *See—*
Gambetti, Mario, 4,706,444, Cl. 53-557.000.

Baus, Heinz G. Method for processing and applying a protective foil. 4,707,207, Cl. 156-252.000.

Baxter Travenol Laboratories, Inc.: *See—*
Cabernoch, James L.; and White, Leonard A., 4,706,827, Cl. 215-11.300.
Fentress, Philip W.; Kenley, Rodney S.; and Schnell, William J., 4,707,335, Cl. 422-44.000.
Shah, Dilip H.; and Kopp, Clinton, 4,707,268, Cl. 210-650.000.
Ward, James R., 4,707,389, Cl. 428-36.000.

Bayer Aktiengesellschaft: *See—*
Meyer, Horst; Franckowiak, Gerhard; Rosentreter, Ulrich; Gross, Rainer; Thomas, Gunter; Schramm, Matthias; Kayser, Michael; Seuter, Friedel; Perzborn, Elisabeth; and Bechem, Martin, 4,707,479, Cl. 514-222.000.
Mues, Peter; Kerimis, Dimitrios; Muller, Hanns P.; and Buysch, Hans-Josef, 4,707,539, Cl. 528-371.000.
Rasshofer, Werner; Ganster, Otto; Luckas, Brund; and Rottmaier, Ludwig, 4,707,502, Cl. 521-159.000.
Schafer, Walter; Muller, Hanns P.; Kuchenmeister, Rolf; and Sickert, Armin, 4,707,386, Cl. 427-386.000.
Walkowiak, Michael; Nehren, Klaus; Podszun, Wolfgang; and Finger, Werner, 4,707,504, Cl. 523-109.000.
Wank, Joachim; Waldenrath, Werner; Schmitz, Heinz; and Pakulat, Gunter, 4,707,396, Cl. 428-216.000.

BBC Brown, Boveri & Co., Ltd.: *See—*
Gessinger, Gernot; Sebalj, Renata; and Widl, Wolfgang, 4,707,576, Cl. 200-146.00R.
Meyer, Gundolf; and Verpoort, Clemeens, 4,706,361, Cl. 29-423.000.

Beale, Harry A. Glass having controllable infrared transmission. 4,707,412, Cl. 428-432.000.

Beaton, William I.; Hensley, Albert L.; and Evans, April J., to Amoco Corporation. Catalyst for demetallation and desulfurization of heavy hydrocarbons. 4,707,466, Cl. 502-313.000.

Bebbington, John R. W.; and Bebbington, Julie C. Clothespin holder. 4,706,859, Cl. 224-224.000.

Bebbington, Julie C.: *See—*
Bebbington, John R. W.; and Bebbington, Julie C., 4,706,859, Cl. 224-224.000.

Bechem, Martin: *See—*
Meyer, Horst; Franckowiak, Gerhard; Rosentreter, Ulrich; Gross, Rainer; Thomas, Gunter; Schramm, Matthias; Kayser, Michael; Seuter, Friedel; Perzborn, Elisabeth; and Bechem, Martin, 4,707,479, Cl. 514-222.000.

Becher, Patrick J. Carrying container for returnable cans. 4,706,805, Cl. 206-144.000.

Beck, Harold K.: *See—*
White, Kevin M.; and Beck, Harold K., 4,706,746, Cl. 166-106.000.

Becker-Pronte GmbH: *See—*
Stromberg, Wilfried; and Kuhnigk, Theo, 4,706,451, Cl. 59-85.000.

Beckman Industrial Corporation: *See—*
Harman, John N., III; and Neti, Radhakrishna M., 4,707,244, Cl. 204-430.000.

Beckwith, John R., to General Motors Corporation. Compartment lid torque rod opener assist assembly. 4,706,334, Cl. 16-308.000.

Becton, Dickinson and Company: *See—*
Sage, Burton H., Jr., 4,707,451, Cl. 436-63.000.
Wagner, Daniel B.; and Baffi, Robert A., 4,707,453, Cl. 436-501.000.

Beecham Group p.l.c.: *See—*
Bywater, Robert J., 4,707,474, Cl. 514-196.000.

Beer, James J.; and Lee, Do I., to Dow Chemical Company, The. Sheets having improved stiffness from fiber, latex and coalescing agent. 4,707,221, Cl. 162-158.000.

Beg, Mirza A.: *See—*
Baker, Donal E.; and Beg, Mirza A., 4,707,142, Cl. 368-46.000.

Beim, Rudolf, to Ford Motor Company. Creeper speed actuator for a tractor transmission. 4,706,519, Cl. 74-745.000.

Beisel, Christopher: *See—*
Kieff, Elliott; Tanner, Jerome; Hummel, Mary; and Beisel, Christopher, 4,707,358, Cl. 424-89.000.

Bell & Howell Company: *See—*
Paske, Richard, Jr.; Pallmer, Michael; and King, William L., Jr., 4,707,297, Cl. 252-301.160.

Belt, Angela: *See—*
Hunter, Jennie C.; Belt, Angela; Sotos, Lynn S.; and Fonda, Michelle E., 4,707,447, Cl. 435-132.000.

Bendix Electronics Limited: *See—*
Anderson, Andrew G.; and Shoji, Leigh A., 4,706,521, Cl. 74-785.000.

Bendix France: *See—*
Kervagoret, Gilbert, 4,706,460, Cl. 60-565.000.

Beneteau, Christian: *See—*
Guerard, Norbert; and Beneteau, Christian, 4,707,641, Cl. 318-443.000.

Benford, Arthur E., to Whirlpool Corporation. Refrigerator cabinet construction. 4,707,401, Cl. 428-317.500.

Benisek, Ladislav; and Edmondson, Gerald K., to Wool Development International Limited. Gas filter. 4,707,467, Cl. 502-403.000.

Bennett, Donald; and Saunders, Richard J., to Coherent, Inc. Distributive lasing system. 4,707,837, Cl. 372-34.000.

Bennett, Simon D.: *See—*
Lindow, James T.; Bennett, Simon D.; and Smith, Ian R., 4,707,610, Cl. 250-560.000.

Bentall, Simon W.: *See—*
Hegedus, Leslie J.; and Bentall, Simon W., 4,706,851, Cl. 222-106.000.

Berchtold Medizin-Elektronik GmbH & Co.: *See—*
Roos, Eberhard, 4,706,667, Cl. 128-303.140.

Berg, Marlin C. Anti-theft cover assembly. 4,706,775, Cl. 180-289.000.

Berger, Friedrich: *See—*
Gudymov, Ernest; Fedotov, Vasilij; Semenov, Vladimir; Rodinov, Boris; Berger, Friedrich; Wenzel, Winfried; Peise, Helmut; and Schingnitz, Manfred, 4,707,163, Cl. 48-73.000.

Berger, Leo; Dairman, Wallace M.; Mowles, Thomas F.; and Olson, Gary L., to Hoffmann-La Roche Inc. Substituted piperidinomethylindolone and cyclopent(b)indolone derivatives. 4,707,484, Cl. 514-278.000.

Berger, Michel, to Pradom Limited. Process for preparing composite materials and products obtained with said process. 4,707,231, Cl. 204-164.000.

Bergin, John A.; and English, George J., to GTE Products Corporation. Motor vehicle headlight module. 4,707,767, Cl. 362-61.000.

Berman, Sanford: *See—*
Zollinger, Wendell D.; Boslego, John; Moran, Ellen; Brandt, Brenda; Collins, Hugh; Mandrell, Robert; Altieri, Patricia; and Berman, Sanford, 4,707,543, Cl. 530-402.000.

Bernard, Walter J.; and Fresia, E. James, to Sprague Electric Company. Method of forming a solid tantalum capacitor. 4,706,375, Cl. 29-570.100.

Berry, Jimmy D.: *See—*
Pettibone, Craig R.; and Berry, Jimmy D., 4,706,987, Cl. 280-661.000.

Bersch, Bernhard: *See—*
Warnke, Heinrich; Kaup, Friedel; Bersch, Bernhard; Mertinkat, Willi; and Tenhaven, Ulrich, 4,707,385, Cl. 427-374.100.

Bertozzi, Marcello; and Casamento, Roberto, to Quarzcolor Ianiro S.p.A. Modular, composable lighting projector for illumination from the ground. 4,707,766, Cl. 362-11.000.

Bertsch, John E., to International Business Machines Corporation. Offset corrected amplifier. 4,707,667, Cl. 330-9.000.

Besche, Anton; Osterling, Jost; and Schwarze, Klaus, to Continental Gummi-Werke Aktiengesellschaft. Method of producing hoses with contractable inner linings. 4,707,203, Cl. 156-85.000.

Best, Dieter, to ebm Elektrobau Mufingen GmbH & Co. External rotor motor with connecting plug connection. 4,707,627, Cl. 310-71.000.

Betensky, Ellis I., to U.S. Precision Lens, Inc. Projection lens. 4,707,084, Cl. 350-432.000.

Betterton, Joseph T.; Dykoski, Alan W.; Glover, Alfred H.; Lawless, Daniel F.; McKee, William D.; and Watson, Troy T., to Chrysler Motors Corporation. Fuel inlet assembly. 4,706,707, Cl. 137-565.000.

Betz Laboratories, Inc.: *See*—
Merrell, Gene A., 4,706,579, Cl. 110-343.000.

Beyer, Hasso. Method and apparatus for operating an industrial robot with sensor-correction. 4,707,582, Cl. 219-86.410.

Bianchetti, Alberto: *See*—
Cecchi, Roberto; Boigegrain, Robert; Bianchetti, Alberto; Poggesi, Elena; and Croci, Tiziano, 4,707,497, Cl. 514-647.000.

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Nelson, David; Biddison, William; Rubin, Laurence; Greene, Warner; Leonard, Warren; and Yarchoan, Robert, 4,707,443, Cl. 435-7.000.

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Hendrix, John L., 4,707,454, Cl. 436-546.000.

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Moeller, Rudolph H., 4,706,897, Cl. 241-37.500.

Bione, Angelo A.; and Sirazi, Semir, to Zenith Electronics Corporation. Bridging techniques for local area networks. 4,707,827, Cl. 370-85.000.

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Nuwayser, Elie S., 4,707,362, Cl. 424-433.000.

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Bismarck, Otto H., to RCA Corporation. CMOS input level shifting buffer circuit. 4,707,623, Cl. 307-475.000.

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Wallow, Peter; and Bisping, Bernhard, 4,706,569, Cl. 102-518.000.

Bittner, Charles W., to Precision Automation Co., Inc. Method and apparatus for packaging expansile articles. 4,706,440, Cl. 53-438.000.

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Sanchez-Caldera, Luis E.; Suh, Nam P.; Chun, Jung-Hoon; Lee, Arthur K.; and Blackall, Frederick S., IV, 4,706,730, Cl. 164-135.000.

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Schmidt, Albert L.; Sherwin, Gary W.; Blackham, Kenneth K.; and Johnson, John L., 4,706,679, Cl. 128-639.000.

Blackman, Stephen M., to Federal Paper Board Co., Inc. Vending and reclosure device for powder and granular products. 4,706,875, Cl. 206-626.000.

Blackshire, Robert D.: *See*—
Cuevas, Jess A.; and Blackshire, Robert D., 4,706,909, Cl. 244-122.0AC.

Blaha, William E., to Ideal Industries, Inc. Screw-on electrical connector and method of making it. 4,707,567, Cl. 174-87.000.

Blaskovits, Pavol; Lesnak, Stefan; Martisik, Alojz; Zajac, Jan; Slavkovsky, Jan; Turiansky, Ladislav; and Levius, Rudolf, to Vyskumny ustav zvaracsky. Apparatus for the electroslag surfacing of rolling mill rolls. 4,707,581, Cl. 219-73.110.

Blattner, Dietmar; Dieterle, Hermann; Leutwein, Manfred; and Simon, Horst, to Eastman Kodak Company. Cutting and mounting apparatus. 4,706,370, Cl. 29-564.200.

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Blauhut, Wilfried; Hoschek, Gunter; and Malojer, Robert, to Chemie Linz Aktiengesellschaft. Device for cutting band-shaped or strand-shaped material. 4,706,531, Cl. 83-346.000.

Block, Michael J., to Union Oil Company of California. Solution useful in making carbon-metal phosphate composite. 4,707,299, Cl. 252-400.100.

Blount, Emmitt; Exum, Edward L.; and Wooten, Murthis E. Ash catcher for fireplace insert. 4,706,648, Cl. 126-243.000.

Blue Bell, Inc.: *See*—
Martin, Robert J., 4,707,612, Cl. 250-568.000.

Blue Streak, Inc.: *See*—
Woolsey, Charles F., 4,706,445, Cl. 56-14.700.

Blumenstein, Gary M.: *See*—
Gatechair, Leslie R.; Blumenstein, Gary M.; and Schirmann, Peter J., 4,707,432, Cl. 430-281.000.

Board of Governors of Wayne State University, The: *See*—
Rossmoore, Haroid W., 4,707,282, Cl. 252-11.000.

Board of Regents, The University of Texas System: *See*—
Alderete, John F., 4,707,442, Cl. 435-7.000.

BOC Group, Inc., The: *See*—
Jumeau, Elizabeth J., 4,706,700, Cl. 137-247.290.

Bock, Gustav: *See*—
Lotsch, Wolfgang; Bock, Gustav; and Neumann, Peter, 4,707,548, Cl. 544-284.000.

Bodkin, Lawrence E. Universal fault circuit interrupter. 4,707,759, Cl. 361-48.000.

Boecker, George C., Jr. Offset anchor. 4,706,437, Cl. 52-698.000.

Boegh-Petersen, Allan. Connector assembly for a circuit board testing machine, a circuit board testing machine, and a method of testing a circuit board by means of a circuit board testing machine. 4,707,657, Cl. 324-158.00F.

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Brantl, Victor; Bomann, Werner; and Schill, Herbert, 4,707,475, Cl. 514-215.000.

Boeing Company, The: *See*—
Anderson, David A., 4,707,793, Cl. 364-474.000.
Cole, James B., 4,706,913, Cl. 244-214.000.
Trepus, George E., Jr.; Matin, Barry D.; and Rider, Preston L., 4,707,206, Cl. 156-187.000.

Boekema, Berend: *See*—
Otten, Josephus M.; and Boekema, Berend, 4,706,678, Cl. 128-635.000.

Boggs, Lavada C., to Kimberly-Clark Corporation. Elastic polyether-ester nonwoven web. 4,707,398, Cl. 428-224.000.

Boheim, Gustav: *See*—
Moeller, Reiner; Hetzel, Gert; Saugeon, Ulrich; Boheim, Gustav; and Zurinski, Viktor, 4,707,813, Cl. 367-103.000.

Bohner, Beat; Fory, Werner; Schurter, Rolf; and Pissiotas, Georg, to CIBA-GEIGY Corporation. Pyrazinyl sulfonamides useful as intermediates for herbicides. 4,707,551, Cl. 544-408.000.

Boigegrain, Robert: *See*—
Cecchi, Roberto; Boigegrain, Robert; Bianchetti, Alberto; Poggesi, Elena; and Croci, Tiziano, 4,707,497, Cl. 514-647.000.

Boissier, Andre ; Chabat-Courrede, Jean; and Decaudin, Michel, to Electricite de France (Service National). Method and device for connecting a submersible element to an enclosure under very high pressure. 4,707,002, Cl. 285-334.200.

Bojsen, Erik M., to F. L. Smidth & Co. A/S. Rapping mechanism for an electrostatic precipitator. 4,706,763, Cl. 173-100.000.

Boling, Gerd: *See*—
Steudle, Ernst; Zillikens, Josef; and Boling, Gerd, 4,706,495, Cl. 73-64.300.

Bolmstedt, Ulf; and Lundblad, Bengt, to Alfa-Laval Food & Dairy Engineering AB. Heat exchanger of falling film type. 4,706,741, Cl. 165-115.000.

Bomann, Werner: *See*—
Brantl, Victor; Bomann, Werner; and Schill, Herbert, 4,707,475, Cl. 514-215.000.

Bondinell, William E.; Wen-Fu Ku, Thomas; and Ormsbee, Herbert S., III, to Smithkline Beckman Corporation. 1-phenyl-3-benzazepines and their use for treating gastrointestinal motility disorders. 4,707,483, Cl. 514-273.000.

Bono, Francesco. Transportable, twin telescopic arm platform hoist. 4,706,779, Cl. 182-63.000.

Boone, Rhonda: *See*—
Savit, Carl H.; Boone, Rhonda; and Doyle, Mark, 4,707,787, Cl. 364-420.000.

Boral (USA) Inc.: *See*—
Thompson, Roger D., 4,706,421, Cl. 52-94.000.

Boraso, Romeo: *See*—
Roman, Gianfranco; and Boraso, Romeo, 4,706,906, Cl. 242-86.000.

Borg-Warner Automotive, Inc.: *See*—
McColl, John W.; Mott, Philip J.; and Salle, Ralph D., 4,706,789, Cl. 192-0.075.

Borgmann, Robert E.: *See*—
Monteith, Robert C.; and Borgmann, Robert E., 4,707,585, Cl. 219-121.0LV.

Borowsky, Richard. Method of farbricating an optically graded light occluding gel. 4,707,236, Cl. 204-182.800.

Borst, Willi; and Pfisterer, Reinhard, to USM Corporation. Inlet sleeve for hot-melt dispensers. 4,706,852, Cl. 222-146.200.

Bose, Bimal K., to General Electric Company. Control system for switched reluctance motor. 4,707,650, Cl. 318-685.000.

Boslego, John: *See*—
Zollinger, Wendell D.; Boslego, John; Moran, Ellen; Brandt, Brenda; Collins, Hugh; Mandrell, Robert; Altieri, Patricia; and Berman, Sanford, 4,707,543, Cl. 530-402.000.

Boss, Barbara D.: *See*—
Patrick, James W.; Heinemann, Stephen F.; Boss, Barbara D.; and Cowan, W. Maxwell, 4,707,356, Cl. 424-88.000.

Bouley, Jean C., to Amphenol Corporation. Tulip-shaped IC socket contact. 4,707,052, Cl. 439-844.000.

Boutni, Omar M., to General Electric Company. Thermoplastically moldable compositions. 4,707,511, Cl. 524-311.000.

Bouttes, Jacques: *See*—
Destuynder, Roger; Bouttes, Jacques; and Poisson-Quinton, Philippe, 4,706,902, Cl. 244-76.00C.

Bowen, Chester O., to Phillips Petroleum Company. Reducing the necessary pressure drop through slide valves. 4,706,697, Cl. 137-13.000.

Bowen Tools, Inc.: *See*—
Bishop, Thomas R.; Kovar, Wayne A.; and Roque, Clyde D., 4,706,745, Cl. 166-98.000.

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Chilton, Henry; and Dickson, Lester, 4,706,683, Cl. 128-654.000.

Bowsky, Benjamin; Honkomp, Glenn A.; Burrows, Larry G.; and Wilson, Edward E., to Emerson Electric Co. Terminal pin and end

closure structure for chamber defining housing of hermetic terminal assembly and method of manufacture. 4,707,424, Cl. 429-181.000.

Bowyer, Larry D.: *See*—
Bauer, David L.; Bowyer, Larry D.; Ruby, David M.; and Windhausen, Richard A., 4,707,694, Cl. 340-825.520.

Boyer, James A.; Bridgewater, Bobbie D.; Warner, Donald C.; and Sturdivant, Jerry L., to General Motors Corporation. Integrated direct ignition module. 4,706,639, Cl. 123-647.000.

Bozenmayer, Kurt: *See*—
Davis, Thomas A.; Bozenmayer, Kurt; and Butterworth, Donald J., 4,707,257, Cl. 210-274.000.

BP Chemicals Limited: *See*—
Bullen, David J.; and Umpleby, Jeffrey D., 4,707,517, Cl. 525-72.000.

Brandt, Brenda: *See*—
Zollinger, Wendell D.; Boslego, John; Moran, Ellen; Brandt, Brenda; Collins, Hugh; Mandrell, Robert; Altieri, Patricia; and Berman, Sanford, 4,707,543, Cl. 530-402.000.

Brandt, Incorporated: *See*—
Sherman, William, III; Larkin, Francis C.; and Horvath, Stephen J., 4,707,599, Cl. 250-223.00R.

Branson, Christopher W.: *See*—
Sullivan, Steven K.; and Branson, Christopher W., 4,707,620, Cl. 307-270.000.

Brantl, Victor; Bomann, Werner; and Schill, Herbert, to Boehringer Ingelheim KG. Agent for lowering serum prolactin levels. 4,707,475, Cl. 514-215.000.

Brasey, Pierre-Noel, to Seuref A.G. Vasculoprotecting pharmaceutical compositions. 4,707,360, Cl. 424-94.100.

Brauer, Robert C. Hot air heating system. 4,706,884, Cl. 237-55.000.

Brayman, Jack: *See*—
Zeitlin, Alexander; Brayman, Jack; and Zandel, Adam, 4,706,490, Cl. 72-455.000.

Brenci, Massimo: *See*—
Sottini, Stefano; Brenci, Massimo; Falciai, Riccardo; and Russo, Vera, 4,707,172, Cl. 65-3.110.

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Gudymov, Ernest; Fedotov, Vasilij; Semenov, Vladimir; Rodinov, Boris; Berger, Friedrich; Wenzel, Winfried; Peise, Helmut; and Schingnitz, Manfred, 4,707,163, Cl. 48-73.000.

Brewster, Phillip W.; and Smith, Clinton R., to Exxon Research & Engineering Co. Haze-free polymer additives for fuels and lubricants. 4,707,285, Cl. 252-50.000.

Breyer, Branko; Cikes, Ivo; and Ferek-Petric, Bozidar, to Telectronics N.V. Cardiac ultrasonically marked leads and method for used same. 4,706,681, Cl. 128-642.000.

Breyer, Karl; and Tesar, Roland, to Herion-Werke KG. Control valve. 4,707,278, Cl. 251-122.000.

Bricker, Melvin E., to Bricker Products, Inc. Pusher plate handle for a shredder attachment of a food processor. 4,706,895, Cl. 241-37.500.

Bricker Products, Inc.: *See*—
Bricker, Melvin E., 4,706,895, Cl. 241-37.500.

Bridgestone Corporation: *See*—
Iwasawa, Shigeru; and Ishiwaka, Takumi, 4,707,408, Cl. 428-379.000.
Morimura, Yasuhiro; Fukuura, Yukio; Ishikawa, Hikaru; Tanuma, Itsuo; and Honda, Toshio, 4,707,397, Cl. 428-216.000.

Bridgestone Tire Company Limited: *See*—
Ohkuni, Shinichiro; and Tamada, Shinichi, 4,706,724, Cl. 152-454.000.
Okuni, Shinichiro; and Kitazawa, Yoichi, 4,706,725, Cl. 152-541.000.

Bridgewater, Bobbie D.: *See*—
Boyer, James A.; Bridgewater, Bobbie D.; Warner, Donald C.; and Sturdivant, Jerry L., 4,706,639, Cl. 123-647.000.

Brielmann, Harry L., Jr.: *See*—
Skutnik, Bolesh J.; and Brielmann, Harry L., Jr., 4,707,076, Cl. 350-96.340.

Briese, Michael W. Insect trap. 4,706,410, Cl. 43-107.000.

Briggs, Randal L., to Advanced NMR Systems, Inc. Function generator for NMR system. 4,707,797, Cl. 364-607.000.

Brink, David L.; Merriman, Michael M.; and Mixon, David A., to University of California, The Regents of the. Apparatus for the hydrolysis and disintegration of lignocellulosic. 4,706,903, Cl. 241-188.00R.

Briscoe, James A.; Putt, James C.; and Phillips, Ronald W., II. Method and apparatus for deicing a leading edge. 4,706,911, Cl. 244-134.00A.

British Aerospace Public Limited Co.: *See*—
Busby, Peter W., 4,707,735, Cl. 358-108.000.

British Petroleum Company p.l.c., The: *See*—
Brookes, David A., 4,707,162, Cl. 44-51.000.
Dean, Alan J.; and Hardy, Ian J., 4,706,756, Cl. 166-344.000.

British Telecommunications: *See*—
Jenkins, Peter D., 4,707,065, Cl. 350-96.200.

Broacha, Firoze H.: *See*—
Sivachenko, Eugene W.; and Broacha, Firoze H., 4,706,319, Cl. 14-73.000.

Brock, James D., to Astec Industries, Inc. Method and apparatus for recycling roofing shingles as an additive to asphalt paving composition. 4,706,893, Cl. 241-23.000.

Broeske, Jeffrey J., to E. R. Wagner Mfg. Company. Pivoted caster wheel and yoke brake having a detent. 4,706,328, Cl. 16-35.00R.

Brokaw, Adrian P.; and Maidique, Modesto A., to Analog Devices, Incorporated. A-to-D converter of the successive-approximation type. 4,707,682, Cl. 340-347.0AD.

Brookes, David A., to British Petroleum Company p.l.c., The. Mineral slurries. 4,707,162, Cl. 44-51.000.

Brooks, Steve M.; and May, David R., to Thorn Emi Patents Limited. Heating apparatus. 4,707,589, Cl. 219-464.000.

Brother Kogyo Kabushiki Kaisha: *See*—
Senda, Yutaka; Sato, Katsuhiko; Kozawa, Tetsuo; Nomura, Etsuzo; and Sakakibara, Yasuo, 4,706,584, Cl. 112-121.110.

Brown, George W., to Mark Controls Corporation. Gate valve. 4,706,934, Cl. 251-87.000.

Brown, Kenton J. Double-drum wood chipper apparatus. 4,706,721, Cl. 144-174.000.

Brown & Williamson Tobacco Corporation: *See*—
Jewell, J. N.; Korte, K. R.; Marshall, R. H.; and Zipperle, Kevin A., 4,706,691, Cl. 131-300.000.

Browne, John; and Dennis, Matthew, to NEI Canada Limited. Multicolor indicator with arcuate pole pieces. 4,706,398, Cl. 40-449.000.

Bruckner Trockentechnik GmbH & Co. KG: *See*—
Gresens, Harry, 4,706,348, Cl. 26-93.000.

Brumbalough, Jack J. Stair unit structure. 4,706,425, Cl. 52-182.000.

Brummel, David J.: *See*—
Johnson, Daniel C.; and Brummel, David J., 4,706,358, Cl. 29-235.000.

Bruno, Richard; and Van Luyt, Balthasar A. G., to U.S. Philips Corporation. System for the line-wise compression of binary data of a picture field in a compression device, decompression device for use in such a system, and display device including such a decompression device. 4,707,729, Cl. 358-13.000.

Bryant, Timothy E.: *See*—
Labinger, Richard L.; Tinnerino, Natale F.; and Bryant, Timothy E., 4,707,734, Cl. 358-106.000.

BS&B Safety Systems, Inc.: *See*—
Short, Edward H., III, 4,706,698, Cl. 137-68.100.

Bubeck, Walter: *See*—
Voss, Gunther M.; Glasel, Volker I.; Gruber, Peter; and Bubeck, Walter, 4,707,309, Cl. 264-12.000.

Buchl, Josef. Automotive valve actuation method. 4,706,619, Cl. 123-90.110.

Buchtel, Dean H.: *See*—
Wareham, Richard A.; and Buchtel, Dean H., 4,707,169, Cl. 55-357.000.

Buckles, John J., to Mobil Oil Corporation. Method of improving CO_2 foam enhanced oil recovery process. 4,706,750, Cl. 166-271.000.

Buckley, Alan; Choe, Eui W.; Stuetz, Dagobert E.; and Garito, Anthony F., to Celanese Corporation. High performance nonlinear optical substrates. 4,707,303, Cl. 252-583.000.

Buckley, Alan: *See*—
Choe, Eui W.; Buckley, Alan; and Garito, Anthony F., 4,707,305, Cl. 260-396.00N.

Buckley, Dennis J.; Cleary, Arthur; and Winey, Calvin, to Advanced Color Technology, Inc. Method and apparatus for transporting and tensioning sheet materials in an ink jet printer. 4,707,712, Cl. 346-136.000.

Buckley, Keith; Prest, Colin T.; and Wilkinson, Paul, to Mars G. B. Limited. Structured food products and process. 4,707,375, Cl. 426-578.000.

Bugaj, Joseph E.; and Grogg, Terry W., to Mallinckrodt, Inc. Radiographic imaging agents. 4,707,353, Cl. 424-1.100.

Bullat, David M., to United States of America, Navy. Metal matrix composite piston head and method of fabrication. 4,706,550, Cl. 92-260.000.

Bullen, David J.; and Umpleby, Jeffrey D., to BP Chemicals Limited. Polymer composition. 4,707,517, Cl. 525-72.000.

Bunch, Wayne R.: *See*—
Vranish, John M.; Bunch, Wayne R.; and Johns, William L., 4,707,013, Cl. 294-119.100.

Burckhardt, Manfred, to Daimler-Benz Aktiengesellschaft. Cooled hydraulic high-performance brake system for motor vehicles. 4,706,459, Cl. 60-562.000.

Burdi, Roger D.: *See*—
Getz, Edward H.; Werner, Kurt; and Burdi, Roger D., 4,706,327, Cl. 15-319.000.

Burkhardt, Gottfried, to Triumph-Adler A.G. Key operated printed circuit switch. 4,707,578, Cl. 200-159.00A.

Burkhead, Herbert A.; and Hunt, Ronald E., to International Business Machines Corporation. Re-inkable ribbon transport system. 4,707,155, Cl. 400-199.000.

Burlington Industries, Inc.: *See*—
Towery, Donald R., 4,707,400, Cl. 428-260.000.

Burns, Edgar, to G & H Technology, Inc. Butt contacts for an electrical connector. 4,707,044, Cl. 439-289.000.

Burns, Joel. Boat mooring line guide and holder. 4,706,594, Cl. 114-230.000.

Burr-Brown Corporation: *See*—
Somerville, Thomas A., 4,707,776, Cl. 363-134.000.

Burrows, Larry G.: *See*—
Bowsky, Benjamin; Honkomp, Glenn A.; Burrows, Larry G.; and Wilson, Edward E., 4,707,424, Cl. 429-181.000.

Busby, Peter W., to British Aerospace Public Limited Co. Surveillance systems. 4,707,735, Cl. 358-108.000.

Butterworth, Donald J.: *See*—
Davis, Thomas A.; Bozenmayer, Kurt; and Butterworth, Donald J., 4,707,257, Cl. 210-274.000.

Buysch, Hans-Josef: *See*—
Mues, Peter; Kerimis, Dimitrios; Muller, Hanns P.; and Buysch, Hans-Josef, 4,707,539, Cl. 528-371.000.

BYK Gulden Lomberg Chemische Fabrik GmbH: *See—*
Amschler, Hermann; and Ulrich, Wolf-Rudiger, 4,707,481, Cl. 514-247.000.
Flockerzi, Dieter; Klemm, Kurt; and Ulrich, Wolf-Rudiger, 4,707,486, Cl. 514-318.000.

Bywater, Robert J., to Beecham Group p.l.c. Veterinary composition of cloxacillin for eye treatment. 4,707,474, Cl. 514-196.000.

C. A. Weidmuller GmbH & Co.: *See—*
Conrad, Horst; Tobergte, Konrad; and Schulze, Rainer, 4,707,563, Cl. 174-50.000.

C.O.M. Cooperativa Operai Mobilieri S.C.R.L.: *See—*
Gamberini, Gino, 4,707,028, Cl. 297-300.000.

Cabernoch, James L.; and White, Leonard A., to Baxter Travenol Laboratories, Inc. Container such as a nursing container, and packaging arrangement therefor. 4,706,827, Cl. 215-11.300.

Cain, Joseph B.: *See—*
Glenn, Raymond R.; Powshok, Andrew T.; Padgett, Robert S.; Uriarte, Pedro; Cain, Joseph B.; and Thaker, Gautam H., 4,707,832, Cl. 370-124.000.

Calabro, John A.: *See—*
Calabro, Salvatore; Calabro, John A.; and Hsu, Chun, 4,707,796, Cl. 364-552.000.

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Chang, Manchium; Colvin, Michael S.; Rembaum, Alan; and Richards, Gil F., 4,707,523, Cl. 525-372.000.

Callens, E. Eugene, Jr.; Crowson, Leslie L., Jr.; Kobs, Robert P.; Tull, Herbert G., III; and Tahtouh, Joseph F., to Morton Thiokol, Inc. Thread gage. 4,706,360, Cl. 29-407.000.

Calmar, Inc.: *See—*
Dobbs, Douglas B., 4,706,888, Cl. 239-478.000.

Camrey Industries, Inc.: *See—*
Garg, Yogesh K.; and Hoffacker, Robert E., 4,707,006, Cl. 292-336.300.

Can, Tran D. Method for manufacturing a swab. 4,707,318, Cl. 264-138.000.

Canadian A.S.E. Limited: *See—*
Croft, George; and Hiscox, Martyn, 4,707,010, Cl. 297-379.000.

Canadian Instrumentation and Research Limited: *See—*
Failes, Michael, 4,707,201, Cl. 156-64.000.

Canadian Patents and Development Limited: *See—*
Dobrowolski, Jerzy A.; and Hara, Elmer H., 4,707,064, Cl. 350-96.190.

Canon Kabushiki Kaisha: *See—*
Arakawa, Kazuhiko; Harada, Yoshihito; Kiuchi, Masayoshi; Tokura, Go; and Fujibayashi, Kazuo, 4,707,097, Cl. 354-217.000.
Ayata, Naoki; Saito, Seiji; Suzuki, Hidetoshi; Ozawa, Kunitaka; and Koumura, Noboru, 4,707,713, Cl. 346-140.00R.
Hara, Toshitami; Sato, Yasushi; Takatori, Yasushi; and Shirato, Yoshiaki, 4,707,705, Cl. 346-75.000.
Hirano, Hirofumi; Nakamura, Masaaki; Hasumi, Hitoshi; Inoue, Shoichi; and Furukawa, Akiteru, 4,707,159, Cl. 400-639.100.
Iizuka, Toshimi; and Kamata, Shigeru, 4,707,083, Cl. 350-429.000.
Ikemori, Keiji; and Koyama, Takeshi, 4,707,103, Cl. 354-403.000.
Inoue, Hiroshi, 4,707,079, Cl. 350-334.000.
Inuzuka, Tsuneki; Kawatsura, Yoshihiro; and Ishida, Masato, 4,707,111, Cl. 355-8.000.
Kanemura, Shoji, 4,707,649, Cl. 318-685.000.
Misumi, Teruo, 4,707,210, Cl. 156-345.000.
Ogura, Shigetaro; and Handa, Yuichi, 4,707,059, Cl. 350-96.130.
Ohno: Akio, 4,707,108, Cl. 355-4.000.
Ohtsuka, Yasumasa; and Ohkubo, Masaharu, 4,707,748, Cl. 358-298.000.
Sawamura, Mitsuharu, 4,707,820, Cl. 369-284.000.
Shimamura, Yoshinori, 4,707,609, Cl. 250-492.100.
Sorimachi, Kanehiro; and Amitani, Joji, 4,707,642, Cl. 318-37.000.
Tokumitsu, Jun; and Sakata, Hajime, 4,707,743, Cl. 358-213.130.

Capodicasa, Gaetano. Refuse treatment apparatus. 4,706,560, Cl. 100-102.000.

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Cargile, John W., Jr., to Kliklok Corporation. Folding carton with improved thread and punch lock. 4,706,879, Cl. 229-194.000.

Cariteau, Bernard; Legros, Jean-Pierre; Charrieras, Andre ; and Feuvrier, Michel, to Mega X Protection. Structure for an in-ground storage bin facility, and method of manufacturing it. 4,706,423, Cl. 52-169.700.

Carl-Zeiss-Stiftung: *See—*
Bittner, Reinhold, 4,707,056, Cl. 350-96.120.
Hohberg, Gerhard, 4,707,596, Cl. 250-201.000.
Reule, Alfred; and Schroder, Joachim, 4,707,838, Cl. 372-38.000.

Carlson, Richard L. Apple orientation apparatus and method. 4,706,797, Cl. 198-394.000.

Carnegis, Nicholas P.: *See—*
Downing, Deborah L.; and Carnegis, Nicholas P., 4,706,992, Cl. 280-801.000.

Carr, David E.: *See—*
Etherington, Harry J. C.; Joslin, Paul C.; Carr, David E.; and Simpson-Davis, Raymond, 4,707,573, Cl. 178-18.000.

Carr, Richard P., to Nalco Chemical Company. Coolant stabilizer. 4,707,286, Cl. 252-75.000.

Carrier Corporation: *See—*
Ballard, Gary W., 4,706,881, Cl. 236-15.0BD.
Hooton, Robert D., 4,706,365, Cl. 29-520.000.
Thompson, Kevin D.; and Ballard, Gary W., 4,707,646, Cl. 318-332.000.

Carrier, Denis; and Saintonge, Andre, to Carrier, Denis. Device for detecting the onset of parturition of a pregnant animal. 4,707,685, Cl. 340-573.000.

Carstensen, Kenneth J. Coupling for tubing or casing and method of assembly. 4,706,997, Cl. 285-13.000.

Casamento, Roberto: *See—*
Bertozzi, Marcello; and Casamento, Roberto, 4,707,766, Cl. 362-11.000.

Caspers, John: *See—*
Baldasarri, Mario; Adams, William R.; and Caspers, John, 4,707,245, Cl. 208-57.000.

Cassier, Pierre: *See—*
Clement, Jean-Luc; Lemaire, Michele; Lange, Catherine; Lhommet, Gerard; Celerier, Jean-Pierre; Basselier, Jean-Jacques; and Cassier, Pierre, 4,707,489, Cl. 514-408.000.

Castricum, Wilhelmus P. H., to Spiro America Inc. Apparatus for cutting hollow pipe. 4,706,481, Cl. 72-49.000.

Catelli, Camillo, to Rossi & Catelli S.p.A. Process for the removal of skins from tomatoes using thermophysical methods. 4,707,372, Cl. 426-481.000.

Caterpillar Industrial Inc.: *See—*
Dawson, Ian J.; and McNutt, Robert L., 4,706,772, Cl. 180-167.000.

Cazaux, Joel: *See—*
Pietryka, Joseph; and Cazaux, Joel, 4,706,733, Cl. 164-416.000.

Cecchi, Roberto; Boigegrain, Robert; Bianchetti, Alberto; Poggesi, Elena; and Croci, Tiziano, to Sanofi. Phenylethanolaminotetralines, a process for their preparation and pharmaceutical compositions containing them. 4,707,497, Cl. 514-647.000.

Cefelin, Pavel: *See—*
Janouch, Vaclav; Hrudkova , Hana; and Cefelin, Pavel, 4,707,516, Cl. 525-60.000.

Celanese Corporation: *See—*
Buckley, Alan; Choe, Eui W.; Stuetz, Dagobert E.; and Garito, Anthony F., 4,707,303, Cl. 252-583.000.
Choe, Eui W.; Buckley, Alan; and Garito, Anthony F., 4,707,305, Cl. 260-396.00N.
Kalnin, Ilmar L.; and Goldberg, Harris A., 4,707,423, Cl. 429-112.000.
LaNieve, H. Leslie, III; Drzal, Robert S.; and Ehrlich, Benjamin S., 4,707,525, Cl. 525-399.000.

Celaries, Jean E., to S. T. Dupont. Writing instrument cap and clip therefor. 4,706,341, Cl. 24-11.00R.

Celerier, Jean-Pierre: *See—*
Clement, Jean-Luc; Lemaire, Michele; Lange, Catherine; Lhommet, Gerard; Celerier, Jean-Pierre; Basselier, Jean-Jacques; and Cassier, Pierre, 4,707,489, Cl. 514-408.000.

Celmer, Walter D.; Cullen, Walter P.; Maeda, Hiroshi; Ruddock, John C.; and Tone, Junsuke, to Pfizer Inc. 19-epi-dianemycin as an anticoccidial and antibacterial agent. 4,707,493, Cl. 514-460.000.

Centaur Fencing Systems, Inc.: *See—*
Robbins, Edward S., Jr., 4,706,942, Cl. 256-35.000.

Centre National de la Recherche Scientifique: *See—*
Dahan, Noel; Guilhaumou, Nicole; and Couty, Rene W., 4,707,086, Cl. 350-536.000.

Centre National de la Recherche Scientifique (CNRS): *See—*
Clement, Jean-Luc; Lemaire, Michele; Lange, Catherine; Lhommet, Gerard; Celerier, Jean-Pierre; Basselier, Jean-Jacques; and Cassier, Pierre, 4,707,489, Cl. 514-408.000.

Centre Technique de l'Industrie des Papiers Cartons et Celluloses: *See—*
Sabater, Jacques; and Bauduin, Serge, 4,707,223, Cl. 162-262.000.

Ceskoslovenska akademie ved: *See—*
Neufuss, Karel; Macku, Ales; Forejt, Antonin; and Kasik, Pavel, 4,707,379, Cl. 427-34.000.

Ceskoslovenskla akademie ved: *See—*
Janouch, Vaclav; Hrudkova , Hana; and Cefelin, Pavel, 4,707,516, Cl. 525-60.000.

Cetus Corporation: *See—*
Geigert, John; Liu, Te-Ning E.; and N'timkulu, Thabiso, 4,707,446, Cl. 435-132.000.
Hunter, Jennie C.; Belt, Angela; Sotos, Lynn S.; and Fonda, Michelle E., 4,707,447, Cl. 435-132.000.

Chabat-Courrede, Jean: *See—*
Boissier, Andre ; Chabat-Courrede, Jean; and Decaudin, Michel, 4,707,002, Cl. 285-334.200.

Chalimbaud, Max, to Societe Industrielle Pecquet, Tesson. Tube plates for heat exchangers. 4,706,743, Cl. 165-134.100.

Chambers, Michael F.: *See—*
Murphy, James E.; and Chambers, Michael F., 4,707,239, Cl. 204-247.000.

Chambers, Robert W., to RCA Corporation. System for transferring and locating a body relative to a support. 4,706,796, Cl. 198-345.000.

Champion Spark Plug Europe S.A.: *See—*
Guerard, Norbert; and Beneteau, Christian, 4,707,641, Cl. 318-443.000.

Chang, Chung L. Armrest support bracket for a reclining seat. 4,707,032, Cl. 297-416.000.

Chang, Manchium; Colvin, Michael S.; Rembaum, Alan; and Richards, Gil F., to California Institute of Technology. Magnetic particles. 4,707,523, Cl. 525-372.000.

Chang, Shih-Chia; and Hicks, David B., to General Motors Corporation. Semiconductor gas sensor having thermally isolated site. 4,706,493, Cl. 73-23.000.

Chant, Peter R., to Firan Corporation. Method for producing circuit boards with deposited metal patterns and circuit boards produced thereby. 4,707,394, Cl. 428-209.000.

Charrieras, Andre : *See*—
Cariteau, Bernard; Legros, Jean-Pierre; Charrieras, Andre ; and Feuvrier, Michel, 4,706,423, Cl. 52-169.700.

Charvin, Philippe; and Vavasseur, Paul, to Commissariat a l'Energie Atomique. Actuator usable in a fluid under high pressure. 4,706,596, Cl. 114-312.000.

Chavannes, Theodore E.: *See*—
Durston, Thomas W.; Fleitz, George D.; Coffelt, Steven R.; Eckman, James D.; Wong, Wayne K.; and Chavannes, Theodore E., 4,707,848, Cl. 379-1.000.

Cheberyak, Mikhail S.: *See*—
Gurevich, Simkha B.; Konstantinov, Vladimir B.; Chernykh, Dmitry F.; Levushkin, Vladislav M.; Pisarevskaya, Svetlana A.; Cheberyak, Mikhail S.; and Latyshev, Alexandr I., 4,707,053, Cl. 350-3.600.

Chemie Linz Aktiengesellschaft: *See*—
Blauhut, Wilfried; Hoschek, Gunter; and Malojer, Robert, 4,706,531, Cl. 83-346.000.
Pieh, Stefan; and Krammer, Johann, 4,707,508, Cl. 524-106.000.

Chen, Chung Y., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Integrated devices including cleaved semiconductor lasers. 4,707,219, Cl. 156-644.000.

Chen, James N.: *See*—
Barnes, Johnny G.; Chen, James N.; and Hayes, Gerald E., 4,707,801, Cl. 364-900.000.

Chen, Jiann-Yuh: *See*—
King, Gail G.; Chen, Jiann-Yuh; and Keys, Barbara J., 4,707,374, Cl. 426-572.000.

Chen, Muh-Juh; and Hwang, Li-Ming, to Chen, Muh-Juh. Windmill apparatus. 4,707,617, Cl. 290-55.000.

Cheo, Peter K.; and Gilden, Meyer, to United Technologies Corporation. Broadband infrared electro-optic modulator having a buried microstrip network. 4,707,060, Cl. 350-96.140.

Chernykh, Dmitry F.: *See*—
Gurevich, Simkha B.; Konstantinov, Vladimir B.; Chernykh, Dmitry F.; Levushkin, Vladislav M.; Pisarevskaya, Svetlana A.; Cheberyak, Mikhail S.; and Latyshev, Alexandr I., 4,707,053, Cl. 350-3.600.

Chervalier, Lucienne. Rotary vacuum bagging device equipped with shaping and compacting boxes. 4,706,441, Cl. 53-512.000.

Cheung, Nelson, to Signode Corporation. Thermoplastic strap weld with encapsulated cavities. 4,707,390, Cl. 428-57.000.

Chevron Research Company: *See*—
Jones, Emrys H., Jr.; and Jackson, Robert E., 4,706,492, Cl. 73-3.000.
Mitchell, Bruce R.; and Vogel, Roger F., 4,707,461, Cl. 502-64.000.

Chiaphua Industries Limited: *See*—
Moon-Kau, David T., 4,706,896, Cl. 241-37.500.

Chiba, Kiyoshi; Ino, Hiromitsu; and Tokumitsu, Kazuto, to Teijin Limited. Amorphous alloy and production method thereof. 4,707,198, Cl. 148-304.000.

Chicopee: *See*—
Anspach, Jean M. H., 4,706,338, Cl. 19-105.000.

Chigira, Sadao: *See*—
Fukushima, Eiji; Tanaka, Minoru; Sanada, Kazuo; and Chigira, Sadao, 4,707,075, Cl. 350-96.260.

Chilton, Henry; and Dickson, Lester, to Bowman Gray School of Medicine, Wake Forest University. Method and apparatus for bolus delivery of gases and aerosols and insufflations. 4,706,683, Cl. 128-654.000.

Chisso Corporation: *See*—
Sugimori, Shigeru; and Goto, Yasuyuki, 4,707,296, Cl. 252-299.670.

Cho, Gyu-Hycong, to Westinghouse Electric Corp. Precommutated current source inverter. 4,707,777, Cl. 363-138.000.

Cho, Soo S., to Macho Products, Inc. Protective headgear. 4,706,305, Cl. 2-425.000.

Choe, Eui W.; Buckley, Alan; and Garito, Anthony F., to Celanese Corporation. Naphthoquinodimethane compositions. 4,707,305, Cl. 260-396.00N.

Choe, Eui W.: *See*—
Buckley, Alan; Choe, Eui W.; Stuetz, Dagobert E.; and Garito, Anthony F., 4,707,303, Cl. 252-583.000.

Chopp Computer Corp.: *See*—
Sullivan, Herbert W.; and Cohn, Leonard A., 4,707,781, Cl. 364-200.000.

Chou, Jau-Yi, to f.m.e. Corporation. Dual-range analog-to-digital convertor. 4,706,767, Cl. 177-50.000.

Christensen, Burton G.; and Ratcliffe, Ronald W., to Merck & Co., Inc. Process for preparing carbapenem compounds. 4,707,547, Cl. 540-310.000.

Christianson, Paul O.; and McDonald, James M., to M.A.C., Inc. Total counterflow heat exchanger. 4,706,646, Cl. 126-117.000.

Chromium Corporation: *See*—
Gary, Joseph V., 4,706,417, Cl. 51-319.000.

Chrysler Motors Corporation: *See*—
Betterton, Joseph T.; Dykoski, Alan W.; Glover, Alfred H.; Lawless, Daniel F.; McKee, William D.; and Watson, Troy T., 4,706,707, Cl. 137-565.000.
Holdren, Earl J.; Owski, Alexander J.; and Fouts, Paul G., 4,707,823, Cl. 370-1.000.

Chu, David T.: *See*—
Ngadi, Sumiaty; and Chu, David T., 4,706,955, Cl. 273-73.00A.

Chu, Edmond Y.; and Valencia, Vance I., to Maxwell Laboratories, Inc. Saturable inductor switch and pulse compression power supply employing the switch. 4,707,619, Cl. 307-106.000.

Chuang, Kuo-Huey. Twin disc type tool turret mechanism for CNC machines. 4,706,351, Cl. 29-39.000.

Chubb & Son's Lock and Safe Company Limited: *See*—
Dyson, George W., 4,707,005, Cl. 292-332.000.

Chun, Jung-Hoon: *See*—
Sanchez-Caldera, Luis E.; Suh, Nam P.; Chun, Jung-Hoon; Lee, Arthur K.; and Blackall, Frederick S., IV, 4,706,730, Cl. 164-135.000.

Chun, Kil Whan; Gilbert, Allan H.; Lang, David J.; and Santos, Edward, to Lever Brothers Company. Particles containing active halogen bleach in a diluted core. 4,707,160, Cl. 8-101.000.

Chung, Alfred: *See*—
Ryan, James W.; and Chung, Alfred, 4,707,490, Cl. 514-423.000.

Chung, Yo C., to Lee, Richard. Automobile compressor-jack device. 4,706,937, Cl. 254-93.00H.

Churchland, Mark T.; and Schilling, Walter W., to MacMillan Bloedel Limited. Oriented strand lay-up. 4,706,799, Cl. 198-457.000.

Chyung, Kenneth; Fenn, Philip M.; and Taylor, Mark P., to Corning Glass Works. Glass-ceramics suitable for ring laser gyros. 4,707,458, Cl. 501-4.000.

CH_2M Hill, Inc.: *See*—
Hickey, Duane B.; and Hickey, Robert V., 4,707,124, Cl. 355-83.000.

Ciba Corning Diagnostics Corp.: *See*—
Lepp, Cyrus A.; Mussatto, James J.; and Ziegenmeyer, James M., 4,707,237, Cl. 204-182.800.

Ciba-Geigy Corporation: *See*—
Blattner, Hans; and Storni, Angelo, 4,707,476, Cl. 514-215.000.
Bohner, Beat; Fory, Werner; Schurter, Rolf; and Pissiotas, Georg, 4,707,551, Cl. 544-408.000.
Gatechair, Leslie R.; Blumenstein, Gary M.; and Schirmann, Peter J., 4,707,432, Cl. 430-281.000.
Martin, Henry; and Fricker, Urs, 4,707,182, Cl. 71-94.000.
Schurter, Rolf; and Pissiotas, Georg, 4,707,177, Cl. 71-90.000.

Cicin-Sain, Ivo, to Danieli & C. Officine Meccaniche SpA; and ITI/CLM Impianti Technici Industriali SpA. Ballast dressing unit on machines which dress and re-distribute railway road bed ballast. 4,706,395, Cl. 37-105.000.

Cikes, Ivo: *See*—
Breyer, Branko; Cikes, Ivo; and Ferek-Petric, Bozidar, 4,706,681, Cl. 128-642.000.

Cincinnati Milacron Inc.: *See*—
Monteith, Robert C.; and Borgmann, Robert E., 4,707,585, Cl. 219-121.0LV.

Cindric, Joseph M.; and Cindric, Mary T. Multi-support display stand for human-shaped figures. 4,706,915, Cl. 248-122.000.

Cindric, Mary T.: *See*—
Cindric, Joseph M.; and Cindric, Mary T., 4,706,915, Cl. 248-122.000.

Ciosek, Carl P.: *See*—
Varma, Ravi K.; Ciosek, Carl P.; and Gordon, Eric M., 4,707,494, Cl. 514-469.000.

Cipelletti, Alberto, to Ditta Cipelletti Alberto. Espresso ice-cream machine. 4,706,473, Cl. 62-342.000.

Citino, Salvatore, to Salday Products Corporation. Homebakers hearth accessory. 4,706,832, Cl. 220-66.000.

Claber, S.p.A.: *See*—
Roman, Gianfranco; and Boraso, Romeo, 4,706,906, Cl. 242-86.000.

Clark, George T.: *See*—
Mowatt, Harry C.; MacDonnell, Alfred T.; and Clark, George T., 4,706,406, Cl. 43-61.000.

Clark, James B., to MicroComputer Accessories Inc. Printer stand and paper refolding apparatus. 4,707,156, Cl. 400-613.200.

Clark, John T.; and Shiffler, Donald A., to Du Pont de Nemours, E. I., and Company. Synthetic water-dispersible fiber. 4,707,407, Cl. 428-361.000.

Cleary, Arthur: *See*—
Allen, David; and Cleary, Arthur, 4,707,704, Cl. 346-24.000.
Buckley, Dennis J.; Cleary, Arthur; and Winey, Calvin, 4,707,712, Cl. 346-136.000.

Clement, Jean-Luc; Lemaire, Michele; Lange, Catherine; Lhommet, Gerard; Celerier, Jean-Pierre; Basselier, Jean-Jacques; and Cassier, Pierre, to Centre National de la Recherche Scientifique (CNRS). Insecticidal and/or acaricidal, including termicidal compositions based on 2,5-disubstituted derivatives of pyrrolidine and/or pyrroline-1. 4,707,489, Cl. 514-408.000.

Clements, Brad; and Keith, John C., to Hewlett-Packard Company. Ergonomic digitizer stylus. 4,707,571, Cl. 178-18.000.

Clements, Ken, to Laser Dynamics, Inc. Extended cavity laser recording method and apparatus. 4,707,814, Cl. 369-13.000.

Clinton, Eric L.: *See*—
Wineland, Richard J.; Nichols, Roberta J.; and Clinton, Eric L., 4,706,629, Cl. 123-478.000.
Wineland, Richard J.; Nichols, Roberta J.; and Clinton, Eric L., 4,706,630, Cl. 123-478.000.

Cloke, Martin; Horton, Michael; Menne, Rudolf; and Stwiorok, Andreas, to Ford Motor Company. Engine combustion chamber construction. 4,706,622, Cl. 123-306.000.

Coatney, Charles W., to Filper Industries, Inc. Color measuring and control device. 4,707,138, Cl. 356-402.000.

Coffelt, Steven R.: *See—*
Durston, Thomas W.; Fleitz, George D.; Coffelt, Steven R.; Eckman, James D.; Wong, Wayne K.; and Chavannes, Theodore E., 4,707,848, Cl. 379-1.000.

Coffen, David L.; Holland, George W.; Mandeville, W. Harry; Rosen, Perry; and Wong, Frederick, to Hoffmann-La Roche Inc. Prostaglandin intermediates. 4,707,555, Cl. 549-311.000.

Coffey, Gerald P.: *See—*
Wu, Mu-Yen M.; Ball, Lawrence E.; and Coffey, Gerald P., 4,707,538, Cl. 528-315.000.

Cogan, Frederick T., to Mitel Corporation. Equipment cabinet. 4,707,764, Cl. 361-390.000.

Coherent, Inc.: *See—*
Bennett, Donald; and Saunders, Richard J., 4,707,837, Cl. 372-34.000.

Cohn, Leonard A.: *See—*
Sullivan, Herbert W.; and Cohn, Leonard A., 4,707,781, Cl. 364-200.000.

Coldren, Bruce E.; and Krause, Kenneth W., to GMF Robotics Corporation. Gray scale vision method and system utilizing same. 4,707,647, Cl. 318-568.000.

Cole, James B., to Boeing Company, The. Variable camber leading edge assembly for an airfoil. 4,706,913, Cl. 244-214.000.

Coleman, William G., Jr.: *See—*
Seto, Belinda P.; Coleman, William G., Jr.; and Gerety, Robert J., 4,707,439, Cl. 435-5.000.

Coles, Bryan W., to Subsea Engineering Associates, Inc. Turbid media viewing system. 4,707,128, Cl. 356-4.000.

Colgate Palmolive Company: *See—*
Ramachandran, Pallassana N.; and Barone, Patrizia, 4,707,289, Cl. 252-135.000.

Collins, Hugh: *See—*
Zollinger, Wendell D.; Boslego, John; Moran, Ellen; Brandt, Brenda; Collins, Hugh; Mandrell, Robert; Altieri, Patricia; and Berman, Sanford, 4,707,543, Cl. 530-402.000.

Collins, Scott J.: *See—*
Omdoll, Paul A.; and Collins, Scott J., 4,706,844, Cl. 221-59.000.

Collins, Truman J.: *See—*
Dossey, Robert L.; and Collins, Truman J., 4,706,949, Cl. 269-283.000.

Colson Castors (U.K.): *See—*
Screen, Stafford T., 4,706,329, Cl. 16-47.000.

Colvin, Michael S.: *See—*
Chang, Manchium; Colvin, Michael S.; Rembaum, Alan; and Richards, Gil F., 4,707,523, Cl. 525-372.000.

Combustion Engineering, Inc.: *See—*
Prairie, Robert S.; and Paskowski, Frank J., Jr., 4,706,900, Cl. 241-121.000.

Comfortex, Inc.: *See—*
Murphy, Mike, 4,706,313, Cl. 5-464.000.

Commissariat a l'Energie Atomique: *See—*
Charvin, Philippe; and Vavasseur, Paul, 4,706,596, Cl. 114-312.000.
Lestelle, Dominique, 4,706,506, Cl. 73-862.040.

Compton, Wayne W., to Kidde Consumer Durables Corporation. Security hinges and junction boxes for lamp housings. 4,706,331, Cl. 16-223.000.

Conductive Containers, Inc.: *See—*
Ohlbach, Ralph C., 4,706,438, Cl. 53-410.000.

Conrad, Horst; Tobergte, Konrad; and Schulze, Rainer, to C. A. Weidmuller GmbH & Co. Component housing for electrical and electronic circuits. 4,707,563, Cl. 174-50.000.

Conrad, Raymond W.: *See—*
Roberts, Thomas G.; Conrad, Raymond W.; and Honeycutt, Thomas E., 4,707,133, Cl. 356-320.000.

Consiglio Nazionale Delle Ricerche: *See—*
Sottini, Stefano; Brenci, Massimo; Falciai, Riccardo; and Russo, Vera, 4,707,172, Cl. 65-3.110.

Consolidation Coal Company: *See—*
Podobinski, David J., 4,707,761, Cl. 361-93.000.

Constant, James N. Coordinate measurement and radar device using image scanner. 4,707,698, Cl. 342-179.000.

Continental Can Company, Inc.: *See—*
Mohr, Glenn R.; and Roth, Donald J., 4,707,213, Cl. 156-380.200.

Continental Gummi-Werke Aktiengesellschaft: *See—*
Besche, Anton; Osterling, Jost; and Schwarze, Klaus, 4,707,203, Cl. 156-85.000.

Cook, Wayne L.; and Huth, Robert P., to Hilton Davis Co. Edible compositions colored with (2-alkoxy-4-sulfonyl-5-alkyphenyl)azo-1-hydroxynaphthalene sulfonic acids. 4,707,373, Cl. 426-540.000.

Cooke, Carl W., to Inventive Packaging Corporation. Tamper-resistant package. 4,706,837, Cl. 220-270.000.

Cooper, Eugene A.: *See—*
Higgins, Marvin L.; Eaton, Bill; Cooper, Eugene A.; and Cordy, Clifford B., Jr., 4,707,692, Cl. 340-805.000.

Copland, George V.: *See—*
Toellner, Robert L.; and Copland, George V., 4,707,699, Cl. 342-352.000.

Coppola, Claude. Hygienic assembly for use by cats. 4,706,606, Cl. 119-1.000.

Cordis Europa N.V.: *See—*
Otten, Josephus M.; and Boekema, Berend, 4,706,678, Cl. 128-635.000.

Cordy, Clifford B., Jr.: *See—*
Higgins, Marvin L.; Eaton, Bill; Cooper, Eugene A.; and Cordy, Clifford B., Jr., 4,707,692, Cl. 340-805.000.

Corghi Elettromeccanica S.p.A.: *See—*
Corghi, Remo, 4,706,458, Cl. 60-546.000.

Corghi, Remo, to Corghi Elettromeccanica S.p.A. Hydraulic system for controlling motor vehicle lifts in general. 4,706,458, Cl. 60-546.000.

Cornell Research Foundation, Inc.: *See—*
Fenner, Brian A., 4,706,525, Cl. 81-15.900.

Cornell, Robert, to 31, Inc. Apparatus for molding metallic articles. 4,706,731, Cl. 164-317.000.

Corning Glass Works: *See—*
Chyung, Kenneth; Fenn, Philip M.; and Taylor, Mark P., 4,707,458, Cl. 501-4.000.

Corrotex Limited: *See—*
Page, Robert G.; and Milton, John S., 4,706,706, Cl. 137-527.800.

Corvese, Vincent, to Oakwood Lymber & Millwork Co. Limited. Recessed decorative moulding for wood panel. 4,706,431, Cl. 52-313.000.

Cote, Roger J.; and Cote, Ronald P. Automatic clay target feeder attachment for trap shooting machines. 4,706,641, Cl. 124-8.000.

Cote, Ronald P.: *See—*
Cote, Roger J.; and Cote, Ronald P., 4,706,641, Cl. 124-8.000.

Cotter, Donald P., to Alumax Inc. Standing seam structure covering system. 4,706,434, Cl. 52-520.000.

Coulter, Thomas R.; Isaacson, Philip O.; and Thiede, Edwin C., to Honeywell Inc. High resolution noncoherent radar imager. 4,707,697, Cl. 342-25.000.

Courtesy Mold & Tool Corporation: *See—*
Kreiseder, Walter J., 4,706,835, Cl. 220-258.000.

Coutin, Pierre F., to R. Alkan & Cie. Device for retaining and releasing a wire for arming bomb fuses. 4,706,541, Cl. 89-1.550.

Couty, Rene W.: *See—*
Dahan, Noel; Guilhaumou, Nicole; and Couty, Rene W., 4,707,086, Cl. 350-536.000.

Covarrubias, David S.; Yassan, Reza M.; Covarrubias, Maria S.; and Revuelta, Arturo, to Covarrubias, David S.; Yassan, Reza M.; Covarrubias, Maria S.; Revuelta, Arturo; and Revuelta, Jose. Chuck and top jaw assemblies. 4,706,973, Cl. 279-1.0SJ.

Covarrubias, Maria S.: *See—*
Covarrubias, David S.; Yassan, Reza M.; Covarrubias, Maria S.; and Revuelta, Arturo, 4,706,973, Cl. 279-1.0SJ.

Covey, Douglas F.; Levine, Jeffrey A.; and Ferrendelli, James A., to Washington University. Anticonvulsant γ-thiobutyrolactone derivatives. 4,707,491, Cl. 514-445.000.

Cowan, W. Maxwell: *See—*
Patrick, James W.; Heinemann, Stephen F.; Boss, Barbara D.; and Cowan, W. Maxwell, 4,707,356, Cl. 424-88.000.

Cowell, Thomas H.: *See—*
Jahr, Ronald S.; and Cowell, Thomas H., 4,707,852, Cl. 379-107.000.

Crapo, Clark C.: *See—*
Malpass, Dennis B.; Fannin, Loyd W.; Crapo, Clark C.; and Triplett, Kelly B., 4,707,462, Cl. 502-153.000.

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Mason, Stanley I., Jr.; Wolfe, Allan P.; and Turner, Robert B., 4,706,600, Cl. 118-31.500.

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Cecchi, Roberto; Boigegrain, Robert; Bianchetti, Alberto; Poggesi, Elena; and Croci, Tiziano, 4,707,497, Cl. 514-647.000.

Croft, George; and Hiscox, Martyn, to Canadian A.S.E. Limited. Inertial latching mechanism for seat assemblies. 4,707,010, Cl. 297-379.000.

Cronin, Penny S. Gloved splint. 4,706,658, Cl. 128-77.000.

Crooks, Lawrence E.: *See—*
Hoenninger, John C., III; and Crooks, Lawrence E., 4,707,661, Cl. 324-309.000.

Croset, Michel R.; Lane, Martin; Winchester, Roy E.; and Worsley, David R., to De La Rue Systems Limited. Method and apparatus for monitoring sheets for overlapping. 4,707,598, Cl. 250-223.00R.

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Callens, E. Eugene, Jr.; Crowson, Leslie L., Jr.; Kobs, Robert P.; Tull, Herbert G., III; and Tahtouh, Joseph F., 4,706,360, Cl. 29-407.000.

Crumbach, Richard; Gillner, Manfred; Schilde, Heinz J.; and Tiedemann, Helmut, to Saint-Gobain Vitrage. Method for covering a lens blank with a protective plastic film. 4,707,208, Cl. 156-285.000.

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Hawes, Timothy R.; Antekeier, Steven A.; Cryderman, Glenn R.; Munger, David I.; Gould, Leonard A.; and Eklund, Louis E., Jr., 4,706,980, Cl. 280-154.000.

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Celmer, Walter D.; Cullen, Walter P.; Maeda, Hiroshi; Ruddock, John C.; and Tone, Junsuke, 4,707,493, Cl. 514-460.000.

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Cullmann, Wolfgang; and Leinfelder, Klaus, 4,706,916, Cl. 248-168.000.

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Cuno Incorporated: *See*—
Barnes, Robert G., Jr.; and Meyering, Mark T., 4,707,265, Cl. 210-638.000.

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Kunz, Dietmar W.; Tuithof, Hans H.; and Cuppen, Johannes J. M., 4,707,659, Cl. 324-309.000.

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Curran, Patrick A.: *See*—
Ang, Saw T.; and Curran, Patrick A., 4,707,721, Cl. 357-54.000.

Curtis, H. Edward; and Gaffney, Thomas J., to American Home Products Corporation. Dispensing container for triphasic. 4,706,815, Cl. 206-531.000.

Curtiss, William P.: *See*—
Sharp, Gordon P.; Curtiss, William P.; and Yundt, George B., 4,706,553, Cl. 98-115.300.

Czvikovszky, Tibor; Kovacs, Gabor; Lakner, Endre; Mahr, Lajos; Somogyi, Agnes; Mikes, Sandor; Kegly, Gyorgy; Muzsai, Istvan; Palotas, Laszlo ; and Pfisztner, Nandor, to Taurus Gumiipari Vallalat. Elastic technical hose with a foam insert. 4,706,711, Cl. 138-103.000.

D.E.A. Digital Electronic Automation S.p.A.: *See*—
Ferrero, Franco; and Garau, Enrico, 4,706,372, Cl. 29-568.000.

D.H. Haden Limited: *See*—
Haden, John D., 4,707,042, Cl. 439-140.000.

D. O. Industries, Inc.: *See*—
Mindell, Marvin I., 4,707,092, Cl. 353-109.000.

Dacey, Ernest A., Jr., to Utica Enterprises, Incorporated. Single station hemming tooling. 4,706,489, Cl. 72-450.000.

Dahan, Noel; Guilhaumou, Nicole; and Couty, Rene W., to Centre National de la Recherche Scientifique. Stage assembly for thermodynamic study under a microscope. 4,707,086, Cl. 350-536.000.

Daicel Chemical Industries, Ltd.: *See*—
Hottori, Makoto; and Yamanaka, Shoji, 4,707,283, Cl. 252-25.000.
Imai, Tatsuhiko; and Kawasawa, Masuo, 4,707,510, Cl. 524-281.000.
Tsuda, Kenji; and Namikoshi, Hajime, 4,707,187, Cl. 106-93.000.
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Daiichi Denshi Kogyo Kabushiki Kaisha: *See*—
Kato, Matsuo; Ohtsuki, Tomonari; Hashimoto, Kazuya; and Nakaide, Masami, 4,706,381, Cl. 29-857.000.

Daimler-Benz Aktiengesellschaft: *See*—
Burckhardt, Manfred, 4,706,459, Cl. 60-562.000.
Eltze, Georg; Kluegl, Wendelin; and Thoma, Frank, 4,706,627, Cl. 123-365.000.
Heimbrodt, Klaus- J.; Motting, Gotz; and Hack, Albert, 4,706,738, Cl. 165-98.000.

Daimon, Akio: *See*—
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Dainihon Glass Industry Co., Ltd.: *See*—
Sugita, Minoru; Nakatsuji, Teruyuki; Fujisaki, Tadashi; Hiraga, Hisao; Nishimoto, Takashi; and Futagawa, Minoru, 4,706,430, Cl. 52-309.160.

Dainippon Screen Mfg. Co., Ltd.: *See*—
Takenaka, Kiyoshi; Ohtsuji, Masahiko; and Kabuto, Hiroaki, 4,707,117, Cl. 355-3.0SH.
Ueyama, Tsutomu, 4,707,123, Cl. 355-73.000.
Yao, Koji, 4,707,683, Cl. 340-347.00P.

Dairman, Wallace M.: *See*—
Berger, Leo; Dairman, Wallace M.; Mowles, Thomas F.; and Olson, Gary L., 4,707,484, Cl. 514-278.000.

Daiya Seiko Kabushiki-Kaisha: *See*—
Inoue, Isao, 4,706,528, Cl. 81-179.000.

Dakin, W. Ray, to Optical Disc Corporation. PLL stabilized frequency modulator with extended low frequency range. 4,707,670, Cl. 332-19.000.

Dame, John B.; Williams, Jackie L.; McCutchan, Thomas F.; and Schneider, Imogene, to United States of America, Army. Immunologically active peptides capable of inducing immunization against malaria and genes encoding therefor. 4,707,357, Cl. 424-88.000.

Dame, John B.: *See*—
McCutchan, Thomas F.; and Dame, John B., 4,707,445, Cl. 435-91.000.

Danby, Gordon T.: *See*—
Minkoff, Lawrence A.; and Danby, Gordon T., 4,707,663, Cl. 324-319.000.

D'Andrade, Bruce M. High efficiency battery operated water gun. 4,706,848, Cl. 222-79.000.

Danfoss A/S: *See*—
Thorsen, Niels P.; Jessen, Gilbert W.; Thomsen, Erik; and Sorensen, Jens R., 4,706,467, Cl. 62-139.000.

D'Angelo, Severino, to Horiba Instruments Incorporated. Torque measuring device having dual range load cells. 4,706,507, Cl. 73-862.080.

Daniele, Joseph J., to Xerox Corporation. High resolution, high efficiency I.R. LED printing array and fabrication method. 4,707,716, Cl. 357-17.000.

Danieli & C. Officine Meccaniche SpA: *See*—
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Daniewski, Andrzej R.: *See*—
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Danloup, Andre ; Galzandat, Pierre; Hubin, Claude; and Storino, Charles, to Essilor International (Compagnie Generale d'Optique). Spectacles formed of a frame and a saddle bridge. 4,707,089, Cl. 351-138.000.

Dapperheld, Steffen, to Hoechst Aktiengesellschaft. Process for the dehalogenation of chloroacetic and bromoacetic acid. 4,707,226, Cl. 204-81.000.

Darbenzio, Anthony. Template for embroidery machine. 4,706,583, Cl. 112-103.000.

Date, Tamotsu: *See*—
Nagayama, Takashi; Otani, Mitsunobu; and Date, Tamotsu, 4,707,260, Cl. 210-386.000.

Davco Manufacturing Corporation: *See*—
Davis, Leland L., 4,706,636, Cl. 123-557.000.

Davidson, Mats I. Device for conveyor tracks. 4,706,800, Cl. 198-685.000.

Davis, Leland L., to Davco Manufacturing Corporation. Purge and prime fuel delivery system and method. 4,706,636, Cl. 123-557.000.

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Davis, William M., to United Pharmaceuticals, Inc. Method for stabilizing a detrusor muscle while increasing detrusor muscle strength. 4,707,480, Cl. 514-228.000.

Davison, Alan: *See*—
Jones, Alun G.; Davison, Alan; and Abrams, Michael J., 4,707,544, Cl. 534-14.000.

Dawson, Ian J.; and McNutt, Robert L., to Caterpillar Industrial Inc. Oscillating scanner arrangement. 4,706,772, Cl. 180-167.000.

Day, Gene F.: *See*—
Bibl, Andreas; Day, Gene F.; and Higginson, John A., 4,706,605, Cl. 118-631.000.

Dayco Products, Inc.: *See*—
Murken, Joseph S., 4,707,262, Cl. 210-448.000.
Oglesby, Donald L.; and Sinnamon, Robert H., 4,706,712, Cl. 138-126.000.

De La Rue Company, The: *See*—
Etherington, Harry J. C.; Joslin, Paul C.; Carr, David E.; and Simpson-Davis, Raymond, 4,707,573, Cl. 178-18.000.

De La Rue Systems Limited: *See*—
Croset, Michel R.; Lane, Martin; Winchester, Roy E.; and Worsley, David R., 4,707,598, Cl. 250-223.00R.

Dean, Alan J.; and Hardy, Ian J., to British Petroleum Company p.l.c. Subsea tool launching equipment. 4,706,756, Cl. 166-344.000.

Debeaud, Pierre, to Albert Denis S.A. Method for heat control of hot runner molds. 4,707,310, Cl. 264-40.600.

DeCamp, Howard S.: *See*—
Voss, David L.; DeCamp, Howard S.; and Culp, Gordon W., 4,707,586, Cl. 219-203.000.

Decaudin, Michel: *See*—
Boissier, Andre ; Chabat-Courrede, Jean; and Decaudin, Michel, 4,707,002, Cl. 285-334.200.

De Cesare, Jim L.: *See*—
Soltermack, Gilbert W., 4,706,462, Cl. 60-712.000.

Deere & Company: *See*—
Meier, Lynn A.; and Saele, Arvid H., 4,707,021, Cl. 296-196.000.
Simon, Merlin E., 4,706,770, Cl. 180-24.020.

Degen, Peter J.; Joffee, Irving B.; and Gsell, Thomas C., to Pall Corporation. Polyamide membrane with controlled surface properties. 4,707,266, Cl. 210-638.000.

Dehner, Guenter, to Siemens Aktiengesellschaft. Computer tomography system and method for operating same. 4,707,786, Cl. 364-414.000.

Delaney, Michael J.: *See*—
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de Larosiere, Pierre J. Stack mold. 4,706,924, Cl. 249-161.000.

Delco Products Overseas Corporation: *See*—
McKernon, David A.; and North, Lawrence A., 4,706,512, Cl. 74-405.000.

Delichte, Lawrence G. Livestock feeder for cylindrical bales. 4,706,609, Cl. 119-60.000.

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Demarne, Henri: *See*—
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Dempsey, Russell M.; Fragala, Anthony R.; LaConti, Anthony B.; and Enos, John F., to United Technologies Corporation. Method for evolution of oxygen with ternary electrocatalysts containing valve metals. 4,707,229, Cl. 204-129.000.

Dempsky, Mark A.: *See*—
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de Neufville, John P.; Rajoria, Dalbir; and Ovshinsky, Stanford R., to Voltaix, Inc. Composite coating for electrochemical electrode and method. 4,707,422, Cl. 429-48.000.
Dennis, Matthew: *See*—
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De Saint-Martin, Lucien: *See*—
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Destuynder, Roger; Bouttes, Jacques; and Poisson-Quinton, Philippe, to Office National d'Etudes et de Recherche Aerospatiales. Active method and installation for the reduction of buffeting of the wings of an aircraft. 4,706,902, Cl. 244-76.00C.
Deutsche ITT Industries GmbH: *See*—
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Deutz-Allis Corporation: *See*—
Huhman, Michael L., 4,706,690, Cl. 130-27.00P.
de Virel, Dufresne, to Thomson CSF. Self alignment device for an optical infrared image observation system. 4,707,736, Cl. 358-113.000.
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Diaz, Joseph; Demarne, Henri; Roncucci, Romeo; and Schmelck, Paul-Henry, to Sanofi. Synthesis of hGRF (somatocrinin) in liquid phase and intermediate peptides. 4,707,541, Cl. 530-324.000.
DiBianca, Frank A., to University of North Carolina at Chapel Hill. Kinestatic charge detection using synchronous displacement of detecting device. 4,707,608, Cl. 250-389.000.
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Dieterle, Hermann: *See*—
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DiPiazza, Philip S.; Lynn, Dale E.; and Weber, Donald J., to American Telephone & Telegraph Company, AT&T Information Systems Inc. Adaptive thresholding scheme for optically-based touch screens. 4,707,689, Cl. 340-706.000.
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Dobbs, Douglas B., to Calmar, Inc. Multi-purpose nozzle assembly. 4,706,888, Cl. 239-478.000.
Dobrowolski, Jerzy A.; and Hara, Elmer H., to Canadian Patents and Development Limited. Optical mixing/demixing device. 4,707,064, Cl. 350-96.190.
Dr. Ing.h.c.F. Porsche Aktiengesellschaft: *See*—
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Dr. Karl Thomae GmbH: *See*—
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Dodge, Larry H.; and Stone, Glen, to Sherwood Medical Company. Fluid collection device with phase partitioning means. 4,707,276, Cl. 210-789.000.
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Studt, William L.; Zimmerman, Harry K.; and Dodson, Stuart A., 4,707,478, Cl. 514-580.000.
Doi, Hachiro; and Yaegashi, Masayuki, to Fuso Keigokin Co., Ltd. Lawn mower. 4,706,446, Cl. 56-295.000.
Don Michael, T. Anthony; and Lambert, Edward H. Non-invasive cardiac device. 4,706,688, Cl. 128-785.000.
Donhauser, Friedrich; Schoengen, Anton; Schroeder, Johann H.; and Porschen, Jorg, to Amberger Kaolinwerke GmbH; and Dynamit Nobel AG. Multistage arrangement for countercurrent separation and methods of operating same. 4,707,274, Cl. 210-774.000.
Donohoe, David G. Tear resistant drum head assembly. 4,706,540, Cl. 84-414.000.
Dopp, Kip H. Bookmark/writing instrument combination. 4,706,995, Cl. 281-42.000.
Dorwart, Richard E. Vehicular spray dampening device. 4,706,981, Cl. 280-154.50R.
Dossey, Robert L.; and Collins, Truman J. Vise jaw support system and interchangeable vise jaws therefor. 4,706,949, Cl. 269-283.000.
Doucet, Charles. Filter with superposed rings for filtering liquids. 4,707,259, Cl. 210-351.000.
Douglas, Larry D.: *See*—
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Dow Chemical Company, The: *See*—
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Hoffman, Dwight K.; and Fernandez, Reet T., 4,707,529, Cl. 525-476.000.
Johnson, Homer K., 4,707,267, Cl. 210-650.000.
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McLachlan, Richard D.; and Rothman, Leslie D., 4,707,134, Cl. 356-342.000.
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Stephens, Keith E.; and Uzee, Andre J., 4,707,522, Cl. 525-334.100.
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Wilson, Wilfred W., 4,707,355, Cl. 424-84.000.
Downing, Deborah L.; and Carnegis, Nicholas P. Seat belt. 4,706,992, Cl. 280-801.000.
Downing, Edgar W. Crab pot construction. 4,706,409, Cl. 43-102.000.
Downs, Robert C.; Nitz, Larry T.; and Wanamaker, Joseph L., to General Motors Corporation. Adaptive direct pressure shift control for a motor vehicle transmission. 4,707,789, Cl. 364-424.100.
Doyle, Arthur F.; and Sklarski, Dennis J., to Essex Group, Inc. Method of making high density moisture resistant mica sheet. 4,707,209, Cl. 156-307.400.
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Drori, Mordeki. Disk filter. 4,707,258, Cl. 210-333.100.
Druy, Mark A.; Tripathy, Sukant K.; and Rubner, Michael F., to GTE Laboratories Incorporated. Multicomponent systems based on polypyrrole. 4,707,527, Cl. 525-417.000.
Drzal, Robert S.: *See*—
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Ghazey, John M., 4,707,731, Cl. 358-22.000.
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Dumbovic, Steve; and Dempsky, Mark A., to Illinois Tool Works Inc. Method for effecting one timer interrupt for multiple port communication. 4,707,782, Cl. 364-200.000.
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Durston, Thomas W.; Fleitz, George D.; Coffelt, Steven R.; Eckman, James D.; Wong, Wayne K.; and Chavannes, Theodore E., to Harris Corporation. Test set communication/interface system. 4,707,848, Cl. 379-1.000.
Dutton, G. Wayne. Process for sensing defects on a smooth cylindrical interior surface in tubing. 4,707,132, Cl. 356-241.000.

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Betterton, Joseph T.; Dykoski, Alan W.; Glover, Alfred H.; Lawless, Daniel F.; McKee, William D.; and Watson, Troy T., 4,706,707, Cl. 137-565.000.
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E. R. Squibb & Sons, Inc.: *See*—
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Swan, Jye P.; Weinerman, Lee S.; and Mayo, Steven A., 4,706,478, Cl. 70-208.000.
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Blattner, Dietmar; Dieterle, Hermann; Leutwein, Manfred; and Simon, Horst, 4,706,370, Cl. 29-564.200.
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Fischer, Helmut, to Siemens Aktiengesellschaft. Apparatus and method for acquiring data and clock pulses from asynchronous data signals. 4,707,842, Cl. 375-110.000.
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Cloke, Martin; Horton, Michael; Menne, Rudolf; and Stwiorok, Andreas, 4,706,622, Cl. 123-306.000.
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Foster, Matthew R., to Marmon Group, Inc., The. Incubation structure. 4,706,608, Cl. 119-35.000.

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Francis, John H.: *See*—
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Rohr, Gustav; and Vetter, Karl-Heinz, 4,707,643, Cl. 318-77.000.

Frankonia Kinderausstattungen GmbH & Co. KG: *See*—
Schrader, Margarete, 4,707,024, Cl. 297-250.000.

Freeman, Thomas R., to Westinghouse Electric Corp. Nuclear reactor control rod with uniformly changeable axial worth. 4,707,329, Cl. 376-449.000.

Frenkel, Robert L.: *See*—
Jenkins, Jerry V.; Sloan, Haskell F.; Frenkel, Robert L.; and Zielinski, Albert, 4,707,251, Cl. 209-569.000.

Fresia, E. James: *See*—
Bernard, Walter J.; and Fresia, E. James, 4,706,375, Cl. 29-570.100.

Fricker, Urs: *See*—
Martin, Henry; and Fricker, Urs, 4,707,182, Cl. 71-94.000.

Friedman, Arthur; Lehman, E. Dale; McAleer, William J.; Schaefer, Ted F.; Scolnick, Edward M.; and Wampler, D. Eugene, to Merck & Co., Inc. Immunogenic HbsAg derived from transformed yeast. 4,707,542, Cl. 530-371.000.

Friehauf, William J.; Janssen, Donovan M.; Kirton, Alan J.; Nard, Michael E.; and Rose, Leroy, to International Business Machines Corporation. Disk drive head access mechanism. 4,707,753, Cl. 360-106.000.

Frisch, Arnold M.; Hollister, Allen L.; and Hutchinson, Larry L., to Tektronix, Inc. Computer-based instrument system. 4,707,834, Cl. 371-20.000.

Friswell, David R., to Zymark Corporation. Laboratory evaporation. 4,707,452, Cl. 436-177.000.

Frito-Lay, Inc.: *See*—
King, Gail G.; Chen, Jiann-Yuh; and Keys, Barbara J., 4,707,374, Cl. 426-572.000.

Fritz, Gerhard; Eggersdorfer, Manfred; and Siegel, Hardo, to BASF Aktiengesellschaft. Preparation of esters of optically active 2-arylalkanoic acids. 4,707,549, Cl. 544-336.000.

Froggatt, Dennis G., to STC plc. Circuit and packet data transmission system. 4,707,826, Cl. 370-60.000.

Frohling, Werner: *See*—
Iniotakis, Nicolaos; von der Decken, Claus-Benedict; Hecker, Rudolf; Frohling, Werner; and Schulten, Rudolf, 4,707,342, Cl. 423-248.000.

Fuji Photo Film Co., Ltd.: *See*—
Endo, Azuchi; and Akimoto, Taizo, 4,707,739, Cl. 358-139.000.
Hashimoto, Hiroshi; Okita, Tsutomu; and Mukaida, Yoshito, 4,707,380, Cl. 427-40.000.
Kato, Mikihiko; Okuzawa, Yasutoshi; Komine, Shigeo; and Morita, Kazuhiko, 4,707,392, Cl. 428-65.000.
Sasaki, Noboru, 4,707,436, Cl. 430-504.000.
Satomura, Masato, 4,707,553, Cl. 546-273.000.
Seshimoto, Osamu; and Nirasawa, Mitsuharu, 4,707,243, Cl. 204-418.000.
Takashima, Masanobu; Satomura, Masato; Iwakura, Ken; and Igarashi, Akira, 4,707,464, Cl. 503-216.000.
Terashita, Takaaki, 4,707,118, Cl. 355-38.000.
Terashita, Takaaki, 4,707,119, Cl. 355-38.000.
Yamamoto, Takashi, 4,707,120, Cl. 355-38.000.

Fuji Xerox Co., Ltd.: *See*—
Tanaka, Hiroyuki; Kin, Seki; and Pu, Lyong S., 4,707,427, Cl. 430-59.000.
Terao, Kazuo; Kubo, Tsutomu; Hyakutake, Nobuo; Tachibana, Hidekiyo; Hama, Jun-ichi; Teshigawara, Touru; and Kajimoto, Masashi, 4,707,428, Cl. 430-102.000.

Fujibayashi, Kazuo: *See*—
Arakawa, Kazuhiko; Harada, Yoshihito; Kiuchi, Masayoshi; Tokura, Go; and Fujibayashi, Kazuo, 4,707,097, Cl. 354-217.000.

Fujii, Etsuo: *See*—
Hattori, Kenji; and Fujii, Etsuo, 4,706,500, Cl. 73-728.000.

Fujii, Fumiaki: *See*—
Suzuki, Toshiro; Fujii, Fumiaki; and Yamada, Izuru, 4,707,654, Cl. 324-158.00R.

Fujii, Yasuhiro: *See*—
Takemae, Yoshihiro; Nakano, Tomio; Tatematsu, Takeo; Ogawa, Junji; Horii, Takashi; Fujii, Yasuhiro; Nakano, Masao; and Tsuge, Norihisa, deceased, 4,707,806, Cl. 365-96.000.

Fujikawa, Katsuhiro, to Mitsubishi Denki Kabushiki Kaisha. Fast-release sewing machine control device. 4,706,588, Cl. 112-239.000.

Fujikura Limited: *See*—
Fukushima, Eiji; Tanaka, Minoru; Sanada, Kazuo; and Chigira, Sadao, 4,707,075, Cl. 350-96.260.

Fujimoto, Keiji: *See*—
Sato, Yoshinori; Tsuchiya, Yukio; and Fujimoto, Keiji, 4,707,363, Cl. 426-3.000.

Fujimura, Shigeki: *See*—
Yoshimura, Shohei; Fujimura, Shigeki; and Sakamoto, Itaru, 4,707,569, Cl. 174-116.000.

Fujino, Akihiko: *See*—
Inoue, Manabu; Fujino, Akihiko; Hirano, Masayasu; Nakai, Masaaki; and Yoshida, Fumio, 4,707,104, Cl. 354-412.000.

Fujioka, Atsushi; Miyadera, Yasuo; and Fukuda, Tomio, to Hitachi Chemical Company, Ltd. Polyamino-bis-maleimide prepolymer, method for manufacture thereof, and method for manufacture of laminate using said prepolymer. 4,707,316, Cl. 264-135.000.

Fujisaki, Tadashi: *See*—
Sugita, Minoru; Nakatsuji, Teruyuki; Fujisaki, Tadashi; Hiraga, Hisao; Nishimoto, Takashi; and Futagawa, Minoru, 4,706,430, Cl. 52-309.160.

Fujisawa, Noriyoshi: *See*—
Sano, Tomohiko; Fujisawa, Noriyoshi; Fukuda, Masataka; and Suganuma, Tsuyoshi, 4,707,292, Cl. 252-174.160.

Fujisawa, Yoshiaki: *See—*
Akazawa, Naoki; Nishi, Kazuhiko; Kawakami, Naoya; Fujisawa, Yoshiaki; and Yamada, Noriyoshi, 4,706,470, Cl. 62-209.000.

Fujita, Katsuto: *See—*
Nagata, Tsuyoshi; and Fujita, Katsuto, 4,707,613, Cl. 250-572.000.

Fujitsu Limited: *See—*
Minami, Akira, 4,707,648, Cl. 318-640.000.
Takahashi, Hitoshi, 4,707,802, Cl. 364-900.000.
Takao, Hisoka; Sato, Toshiro; Saito, Seiichi; and Hayashi, Toshinari, 4,707,622, Cl. 307-448.000.
Takemae, Yoshihiro; Nakano, Tomio; Tatematsu, Takeo; Ogawa, Junji; Horii, Takashi; Fujii, Yasuhiro; Nakano, Masao; and Tsuge, Norihisa, deceased, 4,707,806, Cl. 365-96.000.
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Fukai, Masayuki: *See—*
Yamada, Hiroshi; Iioka, Michihiro; Sugano, Akira; Takita, Atsushi; Nigawara, Seiitsu; and Fukai, Masayuki, 4,707,778, Cl. 364-132.000.

Fukai, Toshimasa: *See—*
Tamaki, Nobuaki; Sakuma, Shinzo; Fukai, Toshimasa; and Takihana, Masatoshi, 4,707,577, Cl. 200-144.00B.

Fukuda, Kenichi: *See—*
Mori, Takashi; Fukuda, Kenichi; and Kurauchi, Yasuhiro, 4,707,234, Cl. 204-182.300.

Fukuda, Masataka: *See—*
Sano, Tomohiko; Fujisawa, Noriyoshi; Fukuda, Masataka; and Suganuma, Tsuyoshi, 4,707,292, Cl. 252-174.160.

Fukuda, Tomio: *See—*
Fujioka, Atsushi; Miyadera, Yasuo; and Fukuda, Tomio, 4,707,316, Cl. 264-135.000.

Fukuhara, Tsuyoshi: *See—*
Yoneda, Norihiko; Fukuhara, Tsuyoshi; and Nozawa, Seiichi, 4,707,536, Cl. 528-198.000.

Fukumoto, Kengi: *See—*
Seno, Makito; Misawa, Yoshihiko; Maeda, Yoshinobu; and Fukumoto, Kengi, 4,706,379, Cl. 29-740.000.

Fukushima, Eiji; Tanaka, Minoru; Sanada, Kazuo; and Chigira, Sadao, to Kabushiki Kaisha Toshiba; and Fujikura Limited. Very-low-temperature fiberscope. 4,707,075, Cl. 350-96.260.

Fukuura, Yukio: *See—*
Morimura, Yasuhiro; Fukuura, Yukio; Ishikawa, Hikaru; Tanuma, Itsuo; and Honda, Toshio, 4,707,397, Cl. 428-216.000.

Fuller, Robert T.: *See—*
Tsang, Joseph C.; Ghezzo, Mario; and Fuller, Robert T., 4,707,455, Cl. 437-57.000.

Furmanek, Robert A.; Mukherjee, Jyoti P.; and Lanese, Pasquale J., to Warner & Swasey Company, The. Method of making a slide and way assembly. 4,706,352, Cl. 29-149.50R.

Furukawa, Akiteru: *See—*
Hirano, Hirofumi; Nakamura, Masaaki; Hasumi, Hitoshi; Inoue, Shoichi; and Furukawa, Akiteru, 4,707,159, Cl. 400-639.100.

Furukawa Electric Co., Ltd., The: *See—*
Kawazoe, Hideyo; Iino, Akira; and Orimo, Katsumi, 4,707,173, Cl. 65-3.120.
Sadamitsu, Kazuo; and Makino, Yoshiyuki, 4,706,713, Cl. 138-137.000.

Furukawa, Shigetaka: *See—*
Kitagishi, Tomoji; Sasaki, Akira; Hakoyama, Akiyoshi; Furukawa, Shigetaka; Suzaki, Masafumi; Kobayashi, Ryooichi; Mikami, Katsumasa; Takahashi, Yoshihito; Nagano, Yousuke; and Honma, Takeo, 4,707,708, Cl. 346-76.0PH.

Furukawa, Yoshimi: *See—*
Kawamoto, Yoshimichi; Furukawa, Yoshimi; Hamada, Tetsuro; and Serizawa, Mitsuya, 4,706,976, Cl. 280-91.000.

Fuso Keigokin Co., Ltd.: *See—*
Doi, Hachiro; and Yaegashi, Masayuki, 4,706,446, Cl. 56-295.000.

Fuss, Peter: *See—*
Pohl, Ludwig; Scheuble, Bernhard; Wachtler, Andreas; Hittich, Reinhard; and Fuss, Peter, 4,707,295, Cl. 252-299.620.

Futagawa, Minoru: *See—*
Sugita, Minoru; Nakatsuji, Teruyuki; Fujisaki, Tadashi; Hiraga, Hisao; Nishimoto, Takashi; and Futagawa, Minoru, 4,706,430, Cl. 52-309.160.

Futamoto, Masaaki; Honda, Yukio; Uesaka, Yasutaro; and Yoshida, Kazuetsu, to Hitachi, Ltd.; and Hitachi Maxell Ltd. Perpendicular magnetic recording medium. 4,707,756, Cl. 360-131.000.

G. D. Searle & Co.: *See—*
Baran, John S.; and Lowrie, Harman S., 4,707,499, Cl. 514-471.000.

G & H Technology, Inc.: *See—*
Burns, Edgar, 4,707,044, Cl. 439-289.000.

Gadefelt, Bengt; and Saaf, Lars, to Saab-Scania Aktoebplag. Cylinder head for an internal combustion engine. 4,706,623, Cl. 123-308.000.

Gaffney, Thomas J.: *See—*
Curtis, H. Edward; and Gaffney, Thomas J., 4,706,815, Cl. 206-531.000.

Gagne, Claude. Fire hydrant hoist. 4,706,939, Cl. 254-332.000.

Gagnebin, Gaston: *See—*
Aellen, Pierre-Andre ; and Gagnebin, Gaston, 4,706,857, Cl. 224-164.000.

Gaiao, Ubirajara: *See—*
Silva, Julio C.; Gaiao, Ubirajara; and Novicki, Eduardo M., 4,707,248, Cl. 208-409.000.

Gallant, James O., to SW Industries, Inc. Adjustable curvature roll. 4,706,349, Cl. 26-104.000.

Galzandat, Pierre: *See—*
Danloup, Andre ; Galzandat, Pierre; Hubin, Claude; and Storino, Charles, 4,707,089, Cl. 351-138.000.

Gamberini, Gino, to C.O.M. Cooperativa Operai Mobilieri S.C.R.L. Adjustable chair. 4,707,028, Cl. 297-300.000.

Gambetti, Mario, to Baumer di Mario Gambetti. Apparatus for wrapping continuously moving articles with heat-shrinkable material. 4,706,444, Cl. 53-557.000.

Game Time, Inc.: *See—*
Shannon, William H.; and Sutton, Wesley D., Jr., 4,706,952, Cl. 272-85.000.

Ganster, Otto: *See—*
Rasshofer, Werner; Ganster, Otto; Luckas, Brund; and Rottmaier, Ludwig, 4,707,502, Cl. 521-159.000.

Ganzer, Winfried, to Kraftwerk Union Aktiengesellschaft. Raw gas/-purified gas heat exchanger. 4,706,742, Cl. 165-119.000.

Garagnani, Enea: *See—*
Forti, Sergio; Garagnani, Enea; and Romanini, Daniele, 4,707,519, Cl. 525-133.000.

Garapick, Peter J.: *See—*
Garapick, Ronald T.; and Garapick, Peter J., 4,706,424, Cl. 52-181.000.

Garapick, Ronald T.; and Garapick, Peter J. Floor module structure. 4,706,424, Cl. 52-181.000.

Garau, Enrico: *See—*
Ferrero, Franco; and Garau, Enrico, 4,706,372, Cl. 29-568.000.

Garbarg, Monique: *See—*
Arrang, Jean-Michel; Garbarg, Monique; Lancelot, Jean-Charles; Lecomte, Jeanne-Marie; Robba, Max-Fernand; and Schwartz, Jean-Charles, 4,707,487, Cl. 514-326.000.

Gardiner, Robert W.; Viney, Brian W.; and Hughes, Garyth, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Brittanic Majesty's Government of the. Alloy production by vapor condensation. 4,707,333, Cl. 420-590.000.

Gardner, Lloyd E.; and Parrott, Stephen L., to Phillips Petroleum Company. Hydrotreating catalyst and process. 4,707,246, Cl. 208-251.00H.

Garg, Yogesh K.; and Hoffacker, Robert E., to Camrey Industries, Inc. Door latch assembly. 4,707,006, Cl. 292-336.300.

Garito, Anthony F.: *See—*
Buckley, Alan; Choe, Eui W.; Stuetz, Dagobert E.; and Garito, Anthony F., 4,707,303, Cl. 252-583.000.
Choe, Eui W.; Buckley, Alan; and Garito, Anthony F., 4,707,305, Cl. 260-396.00N.

Garlen, David; Koehn, Hilde R.; Koehn, Peter W.; and McColl, J. D., to Alpen Tau, Inc. Mature skin treatment and protectant compositions and methods of using same. 4,707,354, Cl. 424-47.000.

Garrett, Roy J., to Ford Motor Company. Automatic power transmission mechanism for a four wheel drive vehicle. 4,706,517, Cl. 74-665.00T.

Garringer, Lester G., to Specialty Maintenance and Construction, Inc. System and method for mechanically joining handrailing members. 4,706,367, Cl. 29-526.00R.

Gary, Joseph V., to Chromium Corporation. Finish for cylinder liners. 4,706,417, Cl. 51-319.000.

Gatechair, Leslie R.; Blumenstein, Gary M.; and Schirmann, Peter J., to Ciba-Geigy Corporation. Ferrocenium/alpha-cleavage photoinitiator systems for free radical polymerizable compositions. 4,707,432, Cl. 430-281.000.

Gauthier, Jean-Claude: *See—*
Latourelle, Guy; and Gauthier, Jean-Claude, 4,706,769, Cl. 180-9.210.

Gavagan, James A., to Irvin Industries, Inc. Free standing sunshade assembly. 4,707,018, Cl. 296-976.000.

Geary, John M., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Ferroelectric liquid crystal devices using field-stabilized states. 4,707,078, Cl. 350-332.000.

Gebr. Happich GmbH: *See—*
Ebert, Charles; Krehl, Hermann; Viertel, Lothar; Hilbert, Bernard; and Walter, Rudiger, 4,707,019, Cl. 296-97.00K.

GEC Avionics Limited: *See—*
Howard, Richard K.; and Marshall, Colin K., 4,707,054, Cl. 350-3.650.

Geddes, Richard: *See—*
Hammerle, Frederick A.; Allen, Philip M.; Geddes, Richard; and Malone, Gary R., 4,706,868, Cl. 227-149.000.

Geddie, John D.: *See—*
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Geigert, John; Liu, Te-Ning E.; and N'timkulu, Thabiso, to Cetus Corporation. Stable haloperoxidase method. 4,707,446, Cl. 435-132.000.

Geist, Michael: *See—*
Batzill, Wolfgang; Dobbelstein, Arnold; Geist, Michael; Schon, Georg; and Ott, Gunther, 4,707,232, Cl. 204-181.700.

Gellatly, Grant, to Philip Morris Incorporated. Method and apparatus for coating reconstituted tobacco. 4,706,692, Cl. 131-370.000.

General Company Limited: *See—*
Ueyama, Seiji; and Onoe, Hiroyasu, 4,707,395, Cl. 428-212.000.

General Dynamics, Pomona Division: *See—*
Long, Stuart G.; and Maciocia, Michael J., 4,707,414, Cl. 428-511.000.

General Electric Company: *See—*
Bose, Bimal K., 4,707,650, Cl. 318-685.000.
Boutni, Omar M., 4,707,511, Cl. 524-311.000.
Greenhalgh, Milton S., 4,707,686, Cl. 340-596.000.

Morris, Vincent P., 4,707,636, Cl. 313-625.000.
Searl, Stephen, 4,706,465, Cl. 62-137.000.
Taylor, Benson T., Jr., 4,706,363, Cl. 29-453.000.
Thomas, Charles E.; and Yerazunis, William S., 4,707,687, Cl. 340-680.000.
Thomas, Charles E., 4,707,688, Cl. 340-680.000.
Tsang, Joseph C.; Ghezzo, Mario; and Fuller, Robert T., 4,707,455, Cl. 437-57.000.
Ulug, Mehmet E., 4,707,830, Cl. 370-89.000.
Whetten, Nathan R., 4,707,607, Cl. 250-385.000.

General Foods Corporation: *See*—
McSweeney, Daniel R., 4,707,366, Cl. 426-96.000.
Vogel, Gerald J.; Kearney, Donald T.; Akpinar, Belkis K.; and Moorman, Charles T., 4,707,368, Cl. 426-386.000.

General Motors Corporation: *See*—
Ball, Daniel A., 4,707,768, Cl. 362-66.000.
Beckwith, John R., 4,706,334, Cl. 16-308.000.
Boyer, James A.; Bridgewater, Bobbie D.; Warner, Donald C.; and Sturdivant, Jerry L., 4,706,639, Cl. 123-647.000.
Chang, Shih-Chia; and Hicks, David B., 4,706,493, Cl. 73-23.000.
Downs, Robert C.; Nitz, Larry T.; and Wanamaker, Joseph L., 4,707,789, Cl. 364-424.100.
Fornuto, Joseph; Gifford, William E.; Nolan, Daniel; and Sherwood, Carl H., 4,706,708, Cl. 137-588.000.
Hartz, James F., 4,706,785, Cl. 188-106.00F.
Horvath, Zoltan L.; Kavanagh, Gary A.; Manning, Steven F.; Pyszel, Ronald J.; Rogers, Lloyd W.; and Schlaps, Edgar H., 4,707,027, Cl. 297-284.000.
Jung, James E.; Koors, Mark A.; and Lutz, Phillip A., 4,706,811, Cl. 206-331.000.
Kobrehel, Michael D., 4,706,412, Cl. 49-352.000.
Lockhart, Bruce D.; McCulloch, Dean E.; Tierney, Gordon L.; and Wehner, Cyrus A., 4,706,790, Cl. 192-3.300.
Nagy, Louis L., 4,707,700, Cl. 343-712.000.
Nitz, Larry T., 4,706,522, Cl. 74-866.000.
Ochsner, Hans W., 4,706,967, Cl. 277-33.000.
Ogle, Douglas R.; Richey, Daniel D.; and Whitehurst, James L., 4,707,616, Cl. 290-48.000.
Ruhlandt, Gerald K.; and Gmurowski, Romuald, 4,706,732, Cl. 164-353.000.
Shellhause, Ronald L., 4,706,784, Cl. 188-79.50B.
Sprenger, Willi, 4,707,591, Cl. 219-541.000.
Stenz, Karl; and Baltes, Horst, 4,707,033, Cl. 297-452.000.
Trombley, Douglas E., 4,706,628, Cl. 123-425.000.
Van Duyn, Paul D., 4,707,769, Cl. 362-66.000.
Van Duyn, Paul D., 4,707,770, Cl. 362-66.000.
Van Duyn, Paul D.; McMahan, David R.; Geddie, John D.; and Nagengast, William E., Jr., 4,707,771, Cl. 362-66.000.
Vivace, Robert T., 4,706,453, Cl. 60-271.000.

General Telephone Co. of Florida: *See*—
Horton, Harold E.; and Roberts, Joseph B., 4,707,850, Cl. 379-29.000.
Horton, Harold E.; and Roberts, Joseph B., 4,707,851, Cl. 379-29.000.

Genicom Corporation: *See*—
Greer, Jerry L., 4,706,561, Cl. 101-93.010.

Genovese, Louis M. Football training apparatus. 4,706,964, Cl. 273-413.000.

Gerety, Robert J.: *See*—
Seto, Belinda P.; Coleman, William G., Jr.; and Gerety, Robert J., 4,707,439, Cl. 435-5.000.

Gerhard Collardin Gesellschaft mit beschraenkter Haftung: *See*—
Portz, Heinz; and Opitz, Reinhard, 4,707,193, Cl. 148-6.15Z.

Gerhard, Tolasch, to Kolubus GmbH & Co. KG. Isolation method and apparatus for sterilizing chambers of filling machines. 4,707,334, Cl. 422-28.000.

Gerstner, Richard; Look, Gunter; Seybold, Werner; and Stener, Werner, to Fichtel & Sachs AG. Hub sleeve for a bicycle hub. 4,707,034, Cl. 301-6.00V.

Gerteis, Hans, to Heinkel Industriezentrifugen GmbH & Co. Filter for squeezing out suspensions. 4,707,256, Cl. 210-236.000.

Gessel, James M.; Jasper, Edward P.; and Kunz, Gary L., to HCC, Inc. Snap-away harvester tine. 4,706,448, Cl. 56-400.000.

Gessinger, Gernot; Sebalj, Renata; and Widl, Wolfgang, to BBC Brown, Boveri & Co., Ltd. Arcing contact tip and method for producing such an arcing contact tip or a comparable component. 4,707,576, Cl. 200-146.00R.

Gestra Aktiengesellschaft: *See*—
Foller, Werner, 4,706,699, Cl. 137-192.000.

Getz, Edward H.; Werner, Kurt; and Burdi, Roger D., to Whirlpool Corporation. Automatic vacuum nozzle height adjustment system for vacuum cleaner. 4,706,327, Cl. 15-319.000.

Geuss, Carlheinz. Target system for use in infrared firing exercises. 4,706,963, Cl. 273-348.100.

Ghazey, John M., to Dubner Computer Systems, Inc. Encoded video television graphics system. 4,707,731, Cl. 358-22.000.

Ghezzo, Mario: *See*—
Tsang, Joseph C.; Ghezzo, Mario; and Fuller, Robert T., 4,707,455, Cl. 437-57.000.

Giammarco, Nicholas J.; Gimpelson, Alexander; Kaplita, George A.; Lopata, Alexander D.; Scaduto, Anthony F.; and Shepard, Joseph F., to International Business Machines Corporation. Lithographic image size reduction. 4,707,218, Cl. 156-643.000.

Giebel, Wolfgang; and Meixner, Heinrich, to Siemens Aktiengesellschaft. Wrap for filling cavities, particularly in cable fittings, with insulating compound and a method for filling the cavities. 4,707,200, Cl. 156-48.000.

Gifford, William E.: *See*—
Fornuto, Joseph; Gifford, William E.; Nolan, Daniel; and Sherwood, Carl H., 4,706,708, Cl. 137-588.000.

Gilbert, Allan H.: *See*—
Chun, Kil Whan; Gilbert, Allan H.; Lang, David J.; and Santos, Edward, 4,707,160, Cl. 8-101.000.

Gilch, Heinz G.; and Haar, Wolfgang, to USM Corporation. Moisture-curable sealant compositions. 4,707,515, Cl. 524-506.000.

Gilden, Meyer: *See*—
Cheo, Peter K.; and Gilden, Meyer, 4,707,060, Cl. 350-96.140.

Gill, Peter J., to GKN Technology Limited. Automatic clearance adjuster. 4,706,620, Cl. 123-90.540.

Gillett, James E.: *See*—
Sherwood, Donald G.; Gillett, James E.; and Ekeroth, Douglas E., 4,707,331, Cl. 376-463.000.

Gillis, Robert E. Orbit tent. 4,706,696, Cl. 135-102.000.

Gillner, Manfred: *See*—
Crumbach, Richard; Gillner, Manfred; Schilde, Heinz J.; and Tiedemann, Helmut, 4,707,208, Cl. 156-285.000.

Gilson, Charles F.: *See*—
Gomes, John M.; and Gilson, Charles F., 4,707,790, Cl. 364-478.000.

Gilvar, Martin; Woodrow, Harold E.; and Nasrah, Camille S., to Morgan Construction Company. Carrier module. 4,706,485, Cl. 72-239.000.

Gimpelson, Alexander: *See*—
Giammarco, Nicholas J.; Gimpelson, Alexander; Kaplita, George A.; Lopata, Alexander D.; Scaduto, Anthony F.; and Shepard, Joseph F., 4,707,218, Cl. 156-643.000.

Giulie, Joe D. Shear punch. 4,706,533, Cl. 83-599.000.

Gjertsen, Robert K.: *See*—
Wilson, John F.; Gjertsen, Robert K.; and Mayers, Joseph B., 4,707,326, Cl. 376-261.000.

GKN Technology Limited: *See*—
Gill, Peter J., 4,706,620, Cl. 123-90.540.

Glasel, Volker I.: *See*—
Voss, Gunther M.; Glasel, Volker I.; Gruber, Peter; and Bubeck, Walter, 4,707,309, Cl. 264-12.000.

Glenn, Raymond R.; Powshok, Andrew T.; Padgett, Robert S.; Uriarte, Pedro; Cain, Joseph B.; and Thaker, Gautam H., to Harris Corporation. Switched point-to-point local area network control mechanism. 4,707,832, Cl. 370-124.000.

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Glover, Alfred H.: *See*—
Betterton, Joseph T.; Dykoski, Alan W.; Glover, Alfred H.; Lawless, Daniel F.; McKee, William D.; and Watson, Troy T., 4,706,707, Cl. 137-565.000.

Glover, Mary A.: *See*—
Elliott, William O.; and Glover, Mary A., 4,706,826, Cl. 213-61.000.

GMF Robotics Corporation: *See*—
Coldren, Bruce E.; and Krause, Kenneth W., 4,707,647, Cl. 318-568.000.

Gmurowski, Romuald: *See*—
Ruhlandt, Gerald K.; and Gmurowski, Romuald, 4,706,732, Cl. 164-353.000.

Gob, Werner, to Fichtel & Sachs AG. Fluid friction clutch. 4,706,792, Cl. 192-58.00B.

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Gudymov, Ernest; Fedotov, Vasilij; Semenov, Vladimir; Rodinov, Boris; Berger, Friedrich; Wenzel, Winfried; Peise, Helmut; and Schingnitz, Manfred, 4,707,163, Cl. 48-73.000.

Goedken, Kenneth D. Auto-wireless shutter release control. 4,707,127, Cl. 354-266.000.

Goel, Anil B., to Ashland Oil, Inc. Copolymerization of blocked polyisocyanates with bicyclic amide acetals. 4,707,532, Cl. 528-45.000.

Goertzen, Gerold G.: *See*—
Herscher, Lee R.; and Goertzen, Gerold G., 4,706,761, Cl. 172-42.000.

Goetz, Dieter: *See*—
Feuchter, Wolfgang; and Goetz, Dieter, 4,706,450, Cl. 57-88.000.

Gold Belt Line, Inc., The: *See*—
Ekins, David L., 4,706,675, Cl. 450-114.000.

Goldberg, Harris A.: *See*—
Kalnin, Ilmar L.; and Goldberg, Harris A., 4,707,423, Cl. 429-112.000.

Goldblatt, Irwin L.; and Shaub, Harold, to Exxon Research and Engineering Company. Lube oil anti-wear agent. 4,707,284, Cl. 252-32.70E.

Golden Aluminum Company: *See*—
Jenkins, Jerry V.; Sloan, Haskell F.; Frenkel, Robert L.; and Zielinski, Albert, 4,707,251, Cl. 209-569.000.

Goldstein, Arthur L.: *See*—
Parsi, Edgardo J.; Sims, Keith J.; and Goldstein, Arthur L., 4,707,240, Cl. 204-290.00F.

Goldstein, Steven A.: *See*—
Matthews, Larry S.; and Goldstein, Steven A., 4,706,659, Cl. 128-92.0VD.

Gomes, John M.; and Gilson, Charles F., to Pitney Bowes Inc. Control signal buffer for use in an inserter system. 4,707,790, Cl. 364-478.000.

Gomez, I. Luis, to Monsanto Company. Composition for imparting fire-resistance to laminating interlayers. 4,707,304, Cl. 252-609.000.

Gondouin, Michel, to S-Cal Research Corp. Heavy oil recovery process. 4,706,751, Cl. 166-272.000.

Gonzales, Arturo E. F. Message cover for electrical wall switches. 4,707,564, Cl. 174-66.000.

Goodman, Walter H., to UOP Inc. Process for separating maltose from mixtures of maltose, glucose and other saccharides. 4,707,190, Cl. 127-46.200.

Goodspeed, Byron L. Apparatus for automatically cleaning smelt spouts of a chemical recovery furnace. 4,706,324, Cl. 15-246.000.

Goodwin, David S.: *See*—
Dodds, Robert E.; Goodwin, David S.; and Patel, Himanshu M., 4,707,426, Cl. 430-25.000.

Goodyear Tire & Rubber Company, The: *See*—
Sturm, Budd H.; and Kuczkowski, Joseph A., 4,707,300, Cl. 252-404.000.

Goorsky, Mark S.; Koch, Mark B.; and Murray, Richard C., Jr., to Spectramed, Inc. Multiple sensor bundle. 4,706,677, Cl. 128-634.000.

Gordon, Eric M.: *See*—
Varma, Ravi K.; Ciosek, Carl P.; and Gordon, Eric M., 4,707,494, Cl. 514-469.000.

Gose, Horst; and Papiernik, Wolfgang, to Siemens Aktiengesellschaft. Method and apparatus for reducing track errors in computer controlled machine tools or industrial robots. 4,707,780, Cl. 364-176.000.

Gosal, Dietmar; Muncke, Ludwig; and Wittich, Kurt, to Mannesmann Rexroth GmbH. Brake valve infinitely variable pressure intensification. 4,706,545, Cl. 91-32.000.

Goto, Yasuyuki: *See*—
Sugimori, Shigeru; and Goto, Yasuyuki, 4,707,296, Cl. 252-299.670.

Gotoh, Yuzoh: *See*—
Inoue, Hidefumi; Gotoh, Yuzoh; and Ishihara, Kimio, 4,706,546, Cl. 91-370.000.

Gouda, Kasim I. Frame for stereotactic surgery. 4,706,665, Cl. 128-303.00B.

Gould, Leonard A.: *See*—
Hawes, Timothy R.; Antekeier, Steven A.; Cryderman, Glenn R.; Munger, David I.; Gould, Leonard A.; and Eklund, Louis E., Jr., 4,706,980, Cl. 280-154.000.

Goward, Robert M.: *See*—
Johnson, Bruce K.; Estevez, Juan; Goward, Robert M.; and Whiteside, George D., 4,707,106, Cl. 354-481.000.

Gradiant Pty Limited: *See*—
Margolis, Joel, 4,707,233, Cl. 204-182.300.

Graftiaux, Robert: *See*—
Nithart, Henri; and Graftiaux, Robert, 4,707,214, Cl. 156-392.000.

Graham, Gary A. Active/passive exercise apparatus. 4,706,953, Cl. 272-120.000.

Graham, James E.: *See*—
Evans, Elaine L.; Graham, James E.; and Weissberg, Alan B., 4,707,405, Cl. 428-336.000.

Graham, Rodney E., to Disposable Waste Systems, Inc. Fluid pressure assisted rotary shaft seal with grooved seal wedge. 4,707,150, Cl. 384-481.000.

Grajek, Leonard A., to Velvac, Inc. Lock protector for fuel cap. 4,706,841, Cl. 220-375.000.

Gramlich, Walter; and Siegel, Hardo, to BASF Aktiengesellschaft. 2-substituted 4,4,7,7-tetramethyl-1,3-dioxacycloheptanes, preparation and use thereof as scents. 4,707,302, Cl. 512-11.000.

Grant, Arie L. Protective curl hair style pillow case. 4,706,314, Cl. 5-490.000.

Grasseschi, John J. Plumbing sealing system. 4,706,702, Cl. 137-360.000.

Grasseschi, John J. Sprinkler assembly. 4,706,759, Cl. 169-51.000.

Graver Company, The: *See*—
Davis, Thomas A.; Bozenmayer, Kurt; and Butterworth, Donald J., 4,707,257, Cl. 210-274.000.

Greathouse, Glen. Portable food holding device. 4,706,817, Cl. 206-545.000.

Greck, Eugene, to Allen-Stevens Drum Accessories Corp. Leak-resistant drum seals. 4,706,836, Cl. 220-256.000.

Greenblatt, Gordon M. Blood warming method and apparatus using gaseous heat exchange medium. 4,707,587, Cl. 219-299.000.

Greene, George O.: *See*—
Loeber, Frederick W.; Cummins, Nolan W.; Modglin, Rodger L.; and Greene, George O., 4,706,723, Cl. 152-410.000.

Greene, Warner: *See*—
Nelson, David; Biddison, William; Rubin, Laurence; Greene, Warner; Leonard, Warren; and Yarchoan, Robert, 4,707,443, Cl. 435-7.000.

Greenhalgh, Milton S., to General Electric Company. Over temperature sensing system for power cables. 4,707,686, Cl. 340-596.000.

Greenhill, Daniel J., Sr.; and Moore, Alfred J., Jr. Mounting utility boxes, panels, and the like. 4,706,359, Cl. 29-271.000.

Greenhouse, Robert J.: *See*—
Muchowski, Joseph M.; Greenhouse, Robert J.; and Guzman, Angel, 4,707,473, Cl. 514-63.000.

Greer, Jerry L., to Genicom Corporation. Printing activator test circuit generating back EMF. 4,706,561, Cl. 101-93.010.

Greifzug Hebezeugbau GmbH: *See*—
Harig, Manfred, 4,706,940, Cl. 254-333.000.

Greiner, Gabriele: *See*—
Schonfeld, Joachim; Lapp, Hans-Gunter; and Greiner, Gabriele, 4,706,898, Cl. 241-73.000.

Gresens, Harry, to Bruckner Trockentechnik GmbH & Co. KG. Tensioning chain provided with grippers. 4,706,348, Cl. 26-93.000.

Griffith, John D., to Sulzer Brothers Limited. Heald frame for a weaving loom. 4,706,716, Cl. 139-91.000.

Grigsby, James D.: *See*—
Root, Steven J.; and Grigsby, James D., 4,706,717, Cl. 139-92.000.

Griswold, Wayne D. Assembly for towing a boat. 4,706,983, Cl. 280-414.200.

Groen, Johannes P.: *See*—
Cuppen, Johannes J. M.; and Groen, Johannes P., 4,707,660, Cl. 324-309.000.

Groetzinger, John K.: *See*—
Heithoff, Robert B.; and Groetzinger, John K., 4,707,175, Cl. 65-27.000.

Grogg, Terry W.: *See*—
Bugaj, Joseph E.; and Grogg, Terry W., 4,707,353, Cl. 424-1.100.

Gross, Rainer: *See*—
Meyer, Horst; Franckowiak, Gerhard; Rosentreter, Ulrich; Gross, Rainer; Thomas, Gunter; Schramm, Matthias; Kayser, Michael; Seuter, Friedel; Perzborn, Elisabeth; and Bechem, Martin, 4,707,479, Cl. 514-222.000.

Grote & Hartmann GmbH & Co. KG: *See*—
Konnemann, Alfred, 4,707,050, Cl. 439-747.000.

Ground, Damon R., to Minnesota Mining and Manufacturing Company. Attaching assembly. 4,706,914, Cl. 248-74.300.

Grow, Terry K. Hangar for fiberglass ducts. 4,706,922, Cl. 248-546.000.

Gruber, Peter: *See*—
Voss, Gunther M.; Glasel, Volker I.; Gruber, Peter; and Bubeck, Walter, 4,707,309, Cl. 264-12.000.

Gsell, Thomas C.: *See*—
Degen, Peter J.; Joffee, Irving B.; and Gsell, Thomas C., 4,707,266, Cl. 210-638.000.

GTE Communication Systems: *See*—
Wagoner, Roy J., 4,707,070, Cl. 350-96.210.

GTE Laboratories Incorporated: *See*—
Amstutz, Stanford R.; and Haselton, E. Fletcher, 4,707,825, Cl. 370-60.000.
Druy, Mark A.; Tripathy, Sukant K.; and Rubner, Michael F., 4,707,527, Cl. 525-417.000.

GTE Products Corporation: *See*—
Bergin, John A.; and English, George J., 4,707,767, Cl. 362-61.000.

Guadagnino, Gus A. Apparatus for dispensing elongated cylindrical objects such as pencils. 4,706,842, Cl. 221-14.000.

Gudymov, Ernest; Fedotov, Vasilij; Semenov, Vladimir; Rodinov, Boris; Berger, Friedrich; Wenzel, Winfried; Peise, Helmut; and Schingnitz, Manfred, to Brennstoffinstitut Freiberg; and Godsudarstvenny Nauchno Tsseledovatelsky I Protektny Institut. Gasification of coal dust. 4,707,163, Cl. 48-73.000.

Guenthner, Russell W.: *See*—
Ryan, Charles P.; and Guenthner, Russell W., 4,707,784, Cl. 364-200.000.

Guerard, Norbert; and Beneteau, Christian, to Champion Spark Plug Europe S.A. Driving mechanism for wiper blades. 4,707,641, Cl. 318-443.000.

Guetersloh, Timothy L., to Research Products Corporation. Humidistat with improved mounting. 4,706,808, Cl. 206-305.000.

Guilhaumou, Nicole: *See*—
Dahan, Noel; Guilhaumou, Nicole; and Couty, Rene W., 4,707,086, Cl. 350-536.000.

Gulton Industries, Inc: *See*—
Lee, Kyong; H.; and Maschhoff, Robert H., 4,707,673, Cl. 333-112.000.

Guntert, Josef: *See*—
Hafele, Walter; and Guntert, Josef, 4,706,626, Cl. 123-364.000.

Gurevich, Simkha B.; Konstantinov, Vladimir B.; Chernykh, Dmitry F.; Levushkin, Vladislav M.; Pisarevskaya, Svetlana A.; Cheberyak, Mikhail S.; and Latyshev, Alexandr I. Holographic recording device. 4,707,053, Cl. 350-3.600.

Guscott, John K., to ADT, Inc. Ceiling mountable passive infrared intrusion detection system. 4,707,604, Cl. 250-342.000.

Gustafson, Carl G.; and Ertell, Carolyn A., to Stauffer Chemical Company. Granular anhydrous dicalcium phosphate compositions suitable for direct compression tableting. 4,707,361, Cl. 424-154.000.

Guzman, Angel: *See*—
Muchowski, Joseph M.; Greenhouse, Robert J.; and Guzman, Angel, 4,707,473, Cl. 514-63.000.

Gyi, Ko K., to Unisys Corp. Spacer means on floppy disks and associated techniques. 4,707,752, Cl. 360-99.000.

Gyori, Steven A., to Technicon Instruments Corporation. Multi-zone heater arrangement for controlling the temperature of a flowing medium. 4,706,736, Cl. 165-30.000.

Gyrex Corporation: *See*—
Polacek, Richard, 4,706,602, Cl. 118-63.000.

H. Krantz GmbH & Co.: *See*—
von Ondarza, Leon, 4,706,315, Cl. 8-155.100.

Haacon Hebetechnik GmbH: *See*—
Riedl, Reinhold, 4,706,936, Cl. 254-89.00R.

Haar, Wolfgang: *See*—
Gilch, Heinz G.; and Haar, Wolfgang, 4,707,515, Cl. 524-506.000.

Haas, Richard M. Switch protection mechanism. 4,707,618, Cl. 307-64.000.

Haase, Axel: *See*—
Frahm, Jens; Haase, Axel; Matthaei, Dieter; Haenicke, Wolfgang; and Merboldt, Klaus-Dietmar, 4,707,658, Cl. 324-309.000.

Haberland, Detlef; Langenwalter, Michael; Panzer, Klaus; Rosen, Hans G.; Spaeter, Lothar; Spaeth, Werner; Seibert, Bernd; and Haltenorth, Helmut, to Siemens Aktiengesellschaft. Opto-electronic module housing. 4,707,067, Cl. 350-96.200.

Haberland, Detlef: *See—*
Falkenstein, Rudolf; Haberland, Detlef; Kaindl, Michael; Haltenorth, Helmut; Prussas, Herbert; and Taumberger, Franz, 4,707,066, Cl. 350-96.200.

Hack, Albert: *See—*
Heimbrodt, Klaus- J.; Motting, Gotz; and Hack, Albert, 4,706,738, Cl. 165-98.000.

Haden, John D., to D.H. Haden Limited. Electrical socket apparatus. 4,707,042, Cl. 439-140.000.

Haenicke, Wolfgang: *See—*
Frahm, Jens; Haase, Axel; Matthaei, Dieter; Haenicke, Wolfgang; and Merboldt, Klaus-Dietmar, 4,707,658, Cl. 324-309.000.

Hafele, Walter; and Guntert, Josef, to Robert Bosch GmbH. Fuel injection pump for internal combustion engines. 4,706,626, Cl. 123-364.000.

Hager, I. Vincent. Selectively switched shading for daylighting and the like. 4,706,649, Cl. 126-419.000.

Hager, Robert J., to Honeywell Inc. Wipe-off apparatus of liquid phase epitaxy of mercury cadmium telluride. 4,706,604, Cl. 118-415.000.

Hahle, Hermann, to Lemforder Metallwaren A.G. Bearing having a divided housing for stabilizing in motor vehicle. 4,707,149, Cl. 384-294.000.

Hailey, Samuel I.; and Alden, John W., to United States of America, Air Force. Automated tape laying machine for composite structures. 4,707,212, Cl. 156-361.000.

Hakoyama, Akiyoshi: *See—*
Kitagishi, Tomoji; Sasaki, Akira; Hakoyama, Akiyoshi; Furukawa, Shigetaka; Suzaki, Masafumi; Kobayashi, Ryooichi; Mikami, Katsumasa; Takahashi, Yoshihito; Nagano, Yousuke; and Honma, Takeo, 4,707,708, Cl. 346-76.0PH.

Hall, David G., to Taylor Made Products Co. Article hanger. 4,706,804, Cl. 206-45.140.

Hall, Gaddis G. Tap connector. 4,707,051, Cl. 439-781.000.

Halliburton Company: *See—*
Toellner, Robert L.; and Copland, George V., 4,707,699, Cl. 342-352.000.
White, Kevin M.; and Beck, Harold K., 4,706,746, Cl. 166-106.000.

Halsell, H. Lee, to Mead Corporation, The. Packaging container for an electric motor. 4,706,809, Cl. 206-319.000.

Haltenorth, Helmut: *See—*
Falkenstein, Rudolf; Haberland, Detlef; Kaindl, Michael; Haltenorth, Helmut; Prussas, Herbert; and Taumberger, Franz, 4,707,066, Cl. 350-96.200.
Haberland, Detlef; Langenwalter, Michael; Panzer, Klaus; Rosen, Hans G.; Spaeter, Lothar; Spaeth, Werner; Seibert, Bernd; and Haltenorth, Helmut, 4,707,067, Cl. 350-96.200.

Halterman, Diane; and Henley, Thomas, to Amchem Products. Manganese removal from aqueous industrial waste effluents. 4,707,273, Cl. 210-724.000.

Hama, Jun-ichi: *See—*
Terao, Kazuo; Kubo, Tsutomu; Hyakutake, Nobuo; Tachibana, Hidekiyo; Hama, Jun-ichi; Teshigawara, Touru; and Kajimoto, Masashi, 4,707,428, Cl. 430-102.000.

Hamada, Kenichi: *See—*
Hirakawa, Tadashi; Yano, Tadashi; and Hamada, Kenichi, 4,706,863, Cl. 226-95.000.

Hamada, Tetsuro: *See—*
Kawamoto, Yoshimichi; Furukawa, Yoshimi; Hamada, Tetsuro; and Serizawa, Mitsuya, 4,706,976, Cl. 280-91.000.

Hamlin, Jerry J. Swivel mount support apparatus. 4,706,575, Cl. 108-102.000.

Hammerle, Frederick A.; Allen, Philip M.; Geddes, Richard; and Malone, Gary R., to TRW Inc. Panel fastener assembly system. 4,706,868, Cl. 227-149.000.

Hammura, Hisao; Echizen, Tetsuro; and Sanada, Yoshio, to Shin-Kobe Electric Machinery Co. Ltd. Oscilloscope. 4,707,691, Cl. 340-754.000.

Hanada, Kenichirou: *See—*
Nishikawa, Toshihide; Hanada, Kenichirou; Nishimura, Yukinobu; and Shimomura, Setsuhiro, 4,706,634, Cl. 123-492.000.

Handa, Yuichi: *See—*
Ogura, Shigetaro; and Handa, Yuichi, 4,707,059, Cl. 350-96.130.

Hansel, George A., III, to W. L. Gore & Associates, Inc. Connector for coaxially shielded cable. 4,707,040, Cl. 439-510.000.

Hanson, James V.: *See—*
Zutell, Stephen W.; Wade, David A.; and Hanson, James V., 4,706,818, Cl. 209-636.000.

Hanya, Masao, to Seikosha Co., Ltd. Device for driving twist pendulums. 4,707,143, Cl. 368-165.000.

Hara, Elmer H.: *See—*
Dobrowolski, Jerzy A.; and Hara, Elmer H., 4,707,064, Cl. 350-96.190.

Hara, Seiji: *See—*
Awane, Misao; Hara, Seiji; and Kobayashi, Satoshi, 4,706,794, Cl. 194-217.000.

Hara, Toshitami; Sato, Yasushi; Takatori, Yasushi; and Shirato, Yoshiaki, to Canon Kabushiki Kaisha. Ink jet recording device. 4,707,705, Cl. 346-75.000.

Hara, Zenichirou; and Iwatsuji, Ichirou, to Mitsubishi Denki Kabushiki Kaisha. Luminance adjusting system for a flat matrix type cathode-ray tube. 4,707,638, Cl. 315-169.300.

Harada, Hiroshi: *See—*
Yamazaki, Michio; Yamagata, Toshihiro; and Harada, Hiroshi, 4,707,192, Cl. 148-3.000.

Harada, Kentaro; and Watanabe, Junji, to Kabushiki Kaisha Toshiba. Image forming apparatus with color change area discriminating function. 4,707,110, Cl. 355-7.000.

Harada, Yoshihito: *See—*
Arakawa, Kazuhiko; Harada, Yoshihito; Kiuchi, Masayoshi; Tokura, Go; and Fujibayashi, Kazuo, 4,707,097, Cl. 354-217.000.

Harbor Branch Oceanographic Institution Inc.: *See—*
Tusting, Robert F., 4,707,094, Cl. 354-64.000.

Harding, Dukecal J., to Magna International Inc. Seat assembly. 4,707,030, Cl. 297-341.000.

Hardy, Ian J.: *See—*
Dean, Alan J.; and Hardy, Ian J., 4,706,756, Cl. 166-344.000.

Harig, Manfred, to Greifzug Hebezeugbau GmbH. Rope hoist apparatus. 4,706,940, Cl. 254-333.000.

Harkey, Charles E.: *See—*
Stonesifer, Gerald M.; and Harkey, Charles E., 4,706,853, Cl. 222-391.000.

Harman, John N., III; and Neti, Radhakrishna M., to Beckman Industrial Corporation. Solid state sensor element. 4,707,244, Cl. 204-430.000.

Harms, John R.; and Anderson, Ronald L., to J. I. Case Company. Grade leveling device. 4,706,762, Cl. 172-684.500.

Harper, George S., to Airpax Corporation. Auxiliary switch actuator mechanism. 4,707,674, Cl. 335-13.000.

Harrington, John P., to Amoco Corporation. Wellhead supported subsea templates and methods. 4,706,757, Cl. 166-349.000.

Harris Corporation: *See—*
Andren, Carl F.; and Olaker, David A., 4,707,839, Cl. 375-1.000.
Durston, Thomas W.; Fleitz, George D.; Coffelt, Steven R.; Eckman, James D.; Wong, Wayne K.; and Chavannes, Theodore E., 4,707,848, Cl. 379-1.000.
Glenn, Raymond R.; Powahok, Andrew T.; Padgett, Robert S.; Uriarte, Pedro; Cain, Joseph B.; and Thaker, Gautam H., 4,707,832, Cl. 370-124.000.
Stratton, Boyd L., 4,707,740, Cl. 358-153.000.
Stratton, Boyd L., 4,707,741, Cl. 358-171.000.

Harris, David H.: *See—*
Paciorek, Kazimiera J. L.; Kratzer, Reinhold H.; Harris, David H.; and Krone-Schmidt, Wilfried, 4,707,556, Cl. 556-403.000.

Harris, Kim A., to IMD Corporation. Pipe scraping device. 4,706,748, Cl. 166-173.000.

Harris, Robert S., to Stant Inc. Vapor recovery system. 4,707,164, Cl. 55-168.000.

Harsco Corporation: *See—*
Johnson, Bruce S., 4,706,825, Cl. 212-182.000.

Hartgring, Cornelis D.: *See—*
Cuppens, Roger; and Hartgring, Cornelis D., 4,707,807, Cl. 365-154.000.

Hartman, Creighton D.: *See—*
Moreno, Frederick E.; and Hartman, Creighton D., 4,706,612, Cl. 122-7.00R.

Hartmann, Dirck T. Dual range planetary transmission for pedal powered vehicles. 4,706,982, Cl. 280-238.000.

Hartmann, Franz; and Matern, Klaus, to Nordischer Maschinenbau Rud. Baader GmbH & Co. KG. Apparatus for handling fish fillets for the purpose of quality inspection. 4,706,336, Cl. 17-55.000.

Hartmann, George C., to Xerox Corporation. Liquid development system. 4,707,112, Cl. 355-10.000.

Hartz, James F., to General Motors Corporation. Single point actuated self-adjusting brake mechanism in a vehicle driven by a cross-drive transmission. 4,706,785, Cl. 188-106.00F.

Harvey, David M.; and Moody, Charistopher J., to Lucas Industries public limited company. Fuel injection nozzles. 4,706,887, Cl. 239-453.000.

Harvey, Donald M., to Eastman Kodak Company. Film speed setting reminder mechanism. 4,707,102, Cl. 354-289.100.

Harvey, Robin J., to Hughes Aircraft Company. Plasma-anode electron gun. 4,707,637, Cl. 315-111.810.

Harwood, Brian K.: *See—*
Schreiber, Karl R.; and Harwood, Brian K., 4,706,384, Cl. 30-91.200.

Hasebe, Hiroshi: *See—*
Asakura, Masahiko; Kawanabe, Tomohiko; Kushida, Noritaka; and Hasebe, Hiroshi, 4,706,637, Cl. 123-589.000.

Hasegawa, Iwao, to Kabushiki Kaisha Toshiba. Electronic private branch exchanges. 4,707,853, Cl. 379-221.000.

Haselton, E. Fletcher: *See—*
Amstutz, Stanford R.; and Haselton, E. Fletcher, 4,707,825, Cl. 370-60.000.

Hashida, Shigesou: *See—*
Kawahigashi, Nobuo; Hashida, Shigesou; and Kojima, Yasunobu, 4,707,314, Cl. 264-127.000.

Hashiguchi, Don H.; and Klar, Erhard, to SCM Metal Products, Inc. Porous metal parts and method for making the same. 4,707,184, Cl. 75-228.000.

Hashimoto, Hiroshi; Okita, Tsutomu; and Mukaida, Yoshito, to Fuji Photo Film Co., Ltd. Process for preparing a magnetic recording medium. 4,707,380, Cl. 427-40.000.

Hashimoto, Ichiro; and Nakamura, Katsushige, to Hewlett-Packard Company. Three dimensional position measurement system using an interferometer. 4,707,129, Cl. 356-4.500.

Hashimoto, Kazuya: *See—*
Kato, Matsuo; Ohtsuki, Tomonari; Hashimoto, Kazuya; and Nakaide, Masami, 4,706,381, Cl. 29-857.000.

Hashimoto, Osamu. Cutting equipment with rules. 4,706,532, Cl. 83-563.000.

Hashimoto, Shintaro; Masuzawa, Sigeaki; Kunita, Hisao; Inoue, Tomohiro; and Nishimura, Kosuke, to Sharp Kabushiki Kaisha. Playback operation circuit in synthetic-speech calculator. 4,707,794, Cl. 364-513.500.

Hass, Gary R.: *See*—
Hayes, Michael E.; Hass, Gary R.; Sharpe, Robert; Nestaas, Eirik; and Ostrovsky, Mikhail V., 4,706,749, Cl. 166-267.000.

Hasumi, Hitoshi: *See*—
Hirano, Hirofumi; Nakamura, Masaaki; Hasumi, Hitoshi; Inoue, Shoichi; and Furukawa, Akiteru, 4,707,159, Cl. 400-639.100.

Hata, Kotaro; and Nakamura, Eitaro, to Nippon Zeon Co., Ltd. Magnetic recording media. 4,707,410, Cl. 428-413.000.

Hata, Kotaro: *See*—
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Soberalski, Edward D.; and Miller, Craig, 4,706,919, Cl. 248-281.100.

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Takao, Hisoka; Sato, Toshiro; Saito, Seiichi; and Hayashi, Toshinari, 4,707,622, Cl. 307-448.000.

Hayashida, Hironori: *See*—
Maruyama, Seiichiro; Hayashida, Hironori; Morita, Kazumasa; and Shiraishi, Yoshitaka, 4,707,512, Cl. 524-504.000.

Hayden, Leland E.: *See*—
Kennon, Jerry M.; and Hayden, Leland E., 4,707,679, Cl. 340-310.00A.

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Barnes, Johnny G.; Chen, James N.; and Hayes, Gerald E., 4,707,801, Cl. 364-900.000.

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HCC, Inc.: *See*—
Gessel, James M.; Jasper, Edward P.; and Kunz, Gary L., 4,706,448, Cl. 56-400.000.

Heckenbach, Theo: *See*—
Zielinski, Erich; and Heckenbach, Theo, 4,706,544, Cl. 89-46.000.

Hecker, Rudolf: *See*—
Iniotakis, Nicolaos; von der Decken, Claus-Benedict; Hecker, Rudolf; Frohling, Werner; and Schulten, Rudolf, 4,707,342, Cl. 423-248.000.

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Ahmad, Syed I.; and Hedaya, Eddie, 4,707,441, Cl. 435-7.000.

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Field, Anthony J.; Heerah, Atma; and Mackereth, Thomas C., 4,707,742, Cl. 358-183.000.

Hefner, Jerry N.: *See*—
Walsh, Michael J.; Anders, John B.; and Hefner, Jerry N., 4,706,910, Cl. 244-130.000.

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Fisch, Michael H.; Hegranes, Barbara A.; and Seubert, George A., Jr., 4,707,509, Cl. 524-147.000.

Heidelberger Druckmaschinen AG: *See*—
Jahn, Hans-Georg, 4,706,601, Cl. 118-46.000.

Heimbigner, Gary L., to Rockwell International Corporation. Small size, high speed GaAs data latch. 4,707,808, Cl. 365-182.000.

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Patrick, James W.; Heinemann, Stephen F.; Boss, Barbara D.; and Cowan, W. Maxwell, 4,707,356, Cl. 424-88.000.

Heinkel Industriezentrifugen GmbH & Co.: *See*—
Gerteis, Hans, 4,707,256, Cl. 210-236.000.

Heise, Thomas M.: *See*—
Anthony, Bruce O., Jr.; Heise, Thomas M.; and Sheppard, Frank P., 4,707,803, Cl. 364-900.000.

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Hendrix, John L., to Bio-Diagnostics, Inc. Fluorescent chlorophyll labeled assay reagents. 4,707,454, Cl. 436-546.000.

Hengeveld, John A.: *See*—
McDonald, Ronald; and Hengeveld, John A., 4,707,843, Cl. 377-8.000.

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Seiter, Wolfgang; and Koch, Otto, 4,707,290, Cl. 252-140.000.

Henley, Thomas: *See*—
Halterman, Diane; and Henley, Thomas, 4,707,273, Cl. 210-724.000.

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Rault, Michel; and Heno, Claude, 4,707,849, Cl. 379-28.000.

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Beaton, William I.; Hensley, Albert L.; and Evans, April J., 4,707,466, Cl. 502-313.000.

Hercules Incorporated: *See*—
Nickol, Robert G., 4,707,189, Cl. 106-176.000.

Herdeman, Robert W., to Procter & Gamble Company, The. Dry bleach stable enzyme composition. 4,707,287, Cl. 252-91.000.

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Lundwall, Neal M.; and Herigstad, Donald, 4,706,568, Cl. 102-513.000.

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Baldauf, Gunter; and Ott, Helmut, 4,706,548, Cl. 91-424.000.
Breyer, Karl; and Tesar, Roland, 4,707,278, Cl. 251-122.000.

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Hessel, Steven R., to Hewlett-Packard Company. Through-traffic priority protocol in a communications system. 4,707,693, Cl. 340-825.510.

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Hewlett-Packard Company: *See*—
Clements, Brad; and Keith, John C., 4,707,571, Cl. 178-18.000.
Hashimoto, Ichiro; and Nakamura, Katsushige, 4,707,129, Cl. 356-4.500.
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Higgins, Marvin L.; Eaton, Bill; Cooper, Eugene A.; and Cordy, Clifford B., Jr., 4,707,692, Cl. 340-805.000.

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Hickey, William S., to Willsboro Wood Products. Fold-away chair. 4,707,023, Cl. 297-31.000.

Hicks, David B.: *See*—
Chang, Shih-Chia; and Hicks, David B., 4,706,493, Cl. 73-23.000.

Hicks, Irwin A., to American Meter Company. Diaphragm gas meter. 4,706,496, Cl. 73-268.000.

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Highlight Industries, Inc.: *See*—
Riemenschneider, Paul K., 4,706,442, Cl. 53-556.000.

Higuchi, Keizo, to Mitsubishi Denki Kabushiki Kaisha. Video display control method and apparatus having video data storage. 4,707,690, Cl. 340-750.000.

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Koboshi, Shigeharu; and Higuchi, Moeko, 4,707,434, Cl. 430-393.000.

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Niwa, Toshio; Himeno, Kiyoshi; and Hihara, Toshio, 4,707,546, Cl. 534-635.000.

Hilbert, Bernard: *See*—
Ebert, Charles; Krehl, Hermann; Viertel, Lothar; Hilbert, Bernard; and Walter, Rudiger, 4,707,019, Cl. 296-97.00K.

Hilbert, Samuel D.: *See*—
Pruett, Wayne P.; Wang, Richard H. S.; Hilbert, Samuel D.; and Weaver, Max A., 4,707,537, Cl. 528-288.000.

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Cook, Wayne L.; and Huth, Robert P., 4,707,373, Cl. 426-540.000.

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Forti, Sergio; Garagnani, Enea; and Romanini, Daniele, 4,707,519, Cl. 525-133.000.

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Hiraga, Hisao: *See*—
Sugita, Minoru; Nakatsuji, Teruyuki; Fujisaki, Tadashi; Hiraga, Hisao; Nishimoto, Takashi; and Futagawa, Minoru, 4,706,430, Cl. 52-309.160.

Hiraishi, Shigetoshi: *See*—
Ikeda, Haruhiko; and Hiraishi, Shigetoshi, 4,707,463, Cl. 503-209.000.

Hirakawa, Tadashi; Yano, Tadashi; and Hamada, Kenichi, to Mitsubishi Jukogyo Kabushiki Kaisha. Intermittent feeding apparatus for a continuous sheet. 4,706,863, Cl. 226-95.000.

Hirano, Hirofumi; Nakamura, Masaaki; Hasumi, Hitoshi; Inoue, Shoichi; and Furukawa, Akiteru, to Canon Kabushiki Kaisha. Serial printer including a laterally reciprocable recording head, paper bail control, paper detection and feeding means, a multicolor ink ribbon including a head cleaning zone, a ribbon cassette and ribbon shift means. 4,707,159, Cl. 400-639.100.

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Inoue, Manabu; Fujino, Akihiko; Hirano, Masayasu; Nakai, Masaaki; and Yoshida, Fumio, 4,707,104, Cl. 354-412.000.

Hirata, Atsumi: *See*—
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Hirosawa, Kozo: *See*—
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Hirose, Sumio: *See*—
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Hirose, Toshifumi: *See*—
Sasaki, Makoto; Yamakawa, Masaki; Hirose, Toshifumi; and Isayama, Katsuhiko, 4,707,526, Cl. 525-404.000.

Hiscox, Martyn: *See*—
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Hitachi Chemical Company, Ltd.: *See*—
Fujioka, Atsushi; Miyadera, Yasuo; and Fukuda, Tomio, 4,707,316, Cl. 264-135.000.

Hitachi Construction Machinery Co., Ltd.: *See*—
Yoshida, Kunihiko; Koshi, Kenichi; and Ichiki, Nobuhiko, 4,706,932, Cl. 251-31.000.

Hitachi, Ltd.: *See*—
Arita, Setsuo; and Sato, Takao, 4,707,621, Cl. 307-441.000.
Futamoto, Masaaki; Honda, Yukio; Uesaka, Yasutaro; and Yoshida, Kazuetsu, 4,707,756, Cl. 360-131.000.
Kajiwara, Toshiyuki; Kimura, Tomoaki; and Nihei, Mitsuo, 4,706,871, Cl. 228-158.000.
Kato, Matsuo; Ohtsuki, Tomonari; Hashimoto, Kazuya; and Nakaide, Masami, 4,706,381, Cl. 29-857.000.
Kitagishi, Tomoji; Sasaki, Akira; Hakoyama, Akiyoshi; Furukawa, Shigetaka; Suzaki, Masafumi; Kobayashi, Ryooichi; Mikami, Katsumasa; Takahashi, Yoshihito; Nagano, Yousuke; and Honma, Takeo, 4,707,708, Cl. 346-76.0PH.
Matono, Takaaki; Murata, Toshinori; Kurita, Toshiyuki; and Nakagawa, Isao, 4,707,732, Cl. 358-31.000.
Nakano, Hiraku, 4,707,798, Cl. 364-765.000.
Nishi, Tomoya; Amari, Mitsuhiro; and Suzuki, Kenji, 4,707,153, Cl. 400-121.000.
Nishijima, Hideo; Okamoto, Kaneyuki; Ito, Takayasu; and Toyoshima, Shuji, 4,707,749, Cl. 360-14.300.
Oguni, Kensaku; Ishibane, Kyuhei; Kuroda, Shigeaki; Yasuda, Hiromu; Sano, Takashi; and Etou, Hironori, 4,706,469, Cl. 62-222.000.
Ohta, Norio; Okamine, Shigenori; Sugita, Yutaka; Seo, Yosuke; and Tamura, Takashi, 4,707,755, Cl. 360-114.000.
Onozawa, Makoto; Osawa, Michitaka; Mackawa, Hitoshi; and Kito, Koji, 4,707,640, Cl. 315-408.000.
Sakai, Yoshio; Nagai, Ryo; Yamamoto, Shuichi; Nakamura, Hideo; and Noguchi, Kouki, 4,707,718, Cl. 357-45.000.
Suzuki, Akira; Tanaka, Hideki; and Murakami, Gen, 4,707,724, Cl. 357-71.000.
Suzuki, Toshiro; Fujii, Fumiaki; and Yamada, Izuru, 4,707,654, Cl. 324-158.00R.
Takahashi, Tadashi; Miyashita, Kunio; and Kawamata, Syooichi, 4,707,695, Cl. 340-870.310.
Tomite, Tosio; Tani, Tatsuhiro; and Kobayashi, Hidemitsu, 4,707,630, Cl. 310-154.000.
Yamada, Hiroshi; Iioka, Michihiro; Sugano, Akira; Takita, Atsushi; Nigawara, Seiitsu; and Fukai, Masayuki, 4,707,778, Cl. 364-132.000.
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Hjersted, Norman B. Process of preparing a preferred ferric sulfate solution, and product. 4,707,349, Cl. 423-558.000.

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Hjertberg, Eric A.; and Hjertberg, Jon A., 4,706,508, Cl. 73-862.470.

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Dapperheld, Steffen, 4,707,226, Cl. 204-81.000.
Meininger, Fritz; and Schlafer, Ludwig, 4,707,545, Cl. 534-588.000.

Hoechst Celanese Corporation: *See*—
Walls, John E.; Telleches, Carlos; and Dhillon, Major S., 4,707,437, Cl. 430-523.000.

Hoenninger, John C., III; and Crooks, Lawrence E., to University of California, The Regents of the. Machine generation of machine-executable state-change instructions for magnetic resonance imaging. 4,707,661, Cl. 324-309.000.

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Warnke, Heinrich; Kaup, Friedel; Bersch, Bernhard; Mertinkat, Willi; and Tenhaven, Ulrich, 4,707,385, Cl. 427-374.100.

Hoffacker, Robert E.: *See*—
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Hoffmann, Dennis, Sr., to Pro Patch Systems, Inc. Vehicle body surface repair patch assembly. 4,707,391, Cl. 428-63.000.

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Berger, Leo; Dairman, Wallace M.; Mowles, Thomas F.; and Olson, Gary L., 4,707,484, Cl. 514-278.000.
Coffen, David L.; Holland, George W.; Mandeville, W. Harry; Rosen, Perry; and Wong, Frederick, 4,707,555, Cl. 549-311.000.

Hofmann, Hans J., to Spraco, Inc. Spray-shower with nozzles, particularly flat fan nozzles. 4,706,889, Cl. 239-550.000.

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Aoki, Yoshiaki; Kayukawa, Naoyuki; Yamazaki, Hatsuo; Ozawa, Yasutomo; and Kitagawa, Hiroki, 4,707,147, Cl. 374-161.000.
Holdren, Earl J.; Owski, Alexander J.; and Fouts, Paul G., to Chrysler Motors Corporation. Fiber optic multiplexed data acquisition system. 4,707,823, Cl. 370-1.000.
Holland, George W.: *See*—
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Hombak Maschinenfabrik GmbH & Co. KG: *See*—
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Asai, Masahiro; Mizushima, Toshio; Kawai, Toshiro; Akutsu, Shigemitsu; and Uozumi, Yoshiaki, 4,706,617, Cl. 123-65.0PE.
Asakura, Masahiko; Kawanabe, Tomohiko; Kushida, Noritaka; and Hasebe, Hiroshi, 4,706,637, Cl. 123-589.000.
Enokida, Susumu; and Ono, Jun, 4,707,020, Cl. 296-191.000.
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Honeycutt, Thomas E.: *See*—
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Barnard, William B., 4,706,862, Cl. 236-46.00R.
Coulter, Thomas R.; Isaacson, Philip O.; and Thiede, Edwin C., 4,707,697, Cl. 342-25.000.
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Miller, John W.; Mittelmark, Melvin F.; and Schmidt, Roger N., 4,707,644, Cl. 318-136.000.
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Bowsky, Benjamin; Honkomp, Glenn A.; Burrows, Larry G.; and Wilson, Edward E., 4,707,424, Cl. 429-181.000.
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Kitagishi, Tomoji; Sasaki, Akira; Hakoyama, Akiyoshi; Furukawa, Shigetaka; Suzaki, Masafumi; Kobayashi, Ryooichi; Mikami, Katsumasa; Takahashi, Yoshihito; Nagano, Yousuke; and Honma, Takeo, 4,707,708, Cl. 346-76.0PH.
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Hooton, Robert D., to Carrier Corporation. Method and apparatus for assembling a ring pipe arrangement. 4,706,365, Cl. 29-520.000.
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Wareham, Richard A.; and Buchtel, Dean H., 4,707,169, Cl. 55-357.000.
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Hopkinson, James F.; and Nambu, Kyojiro, to Kabushiki Kaisha Toshiba. Tomographic apparatus. 4,707,822, Cl. 364-414.000.
Horan, James L.: *See*—
Tauber, Thomas E.; and Horan, James L., 4,707,165, Cl. 55-204.000.
Hori, Fumihisa, to Alps Electric Co., Ltd. Printing mechanism having one electromagnetic selector for two type rings. 4,706,562, Cl. 101-93.220.
Horiba Instruments Incorporated: *See*—
D'Angelo, Severino, 4,706,507, Cl. 73-862.080.
Horiguchi, Akira: *See*—
Moriizumi, Hirokazu; Horiguchi, Akira; and Sasaki, Isao, 4,707,403, Cl. 428-328.000.
Horii, Takashi: *See*—
Takemae, Yoshihiro; Nakano, Tomio; Tatematsu, Takeo; Ogawa, Junji; Horii, Takashi; Fujii, Yasuhiro; Nakano, Masao; and Tsuge, Norihisa, deceased, 4,707,806, Cl. 365-96.000.
Hormadaly, Jacob, to Du Pont de Nemours, E. I., and Company. Method for doping tin oxide. 4,707,346, Cl. 423-518.000.
Horowitz, Bruce S., to Henry Ford Hospital. Temporary radiation therapy. 4,706,652, Cl. 128-1.200.
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Sherman, William, III; Larkin, Francis C.; and Horvath, Stephen J., 4,707,599, Cl. 250-223.00R.
Horvath, Zoltan L.; Kavanagh, Gary A.; Manning, Steven F.; Pyszel, Ronald J.; Rogers, Lloyd W.; and Schlapa, Edgar H., to General Motors Corporation. Pneumatically cushioned vehicle seat(s) and apparatus and method to adjust the same. 4,707,027, Cl. 297-284.000.
Hosaka, Yasuo, to Tokyo Shibaura Denki Kabushiki Kaisha. Solid state image sensor. 4,707,615, Cl. 250-578.000.
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Hoshi, Toshiharu, to Nippon Gakki Seizo Kabushiki Kaisha' . Shadow mask for enhanced resolution and brightness in color cathode ray tubes. 4,707,633, Cl. 313-402.000.
Hosono, Yoichi: *See*—
Ozawa, Hiroshi; Hosono, Yoichi; Hirose, Sumio; Sasagawa, Katsuyoshi; and Imai, Masao, 4,707,430, Cl. 430-270.000.
Hottel, Hoyt C.; Nelson, Robert E.; and Parent, C. Robert, to TPV Energy Systems, Inc. Thermophotovoltaic technology. 4,707,560, Cl. 136-253.000.
Hottori, Makoto; and Yamanaka, Shoji, to Daicel Chemical Industries, Ltd. Electrochromic material and lubricant. 4,707,283, Cl. 252-25.000.
Houle, Timothy H., to A. O. Smith Corporation. Method of making a laminated structure for use in an electrical apparatus. 4,707,313, Cl. 264-61.000.
House Food Industrial Company Limited: *See*—
Yamaguchi, Noriaki; Sugano, Shozo; and Enomoto, Kayo, 4,707,371, Cl. 426-462.000.
Houston, John C., to American Sterilizer Company. High angle link hinge. 4,706,511, Cl. 74-105.000.
Howard, Edward J.; and Howard, Edward J., Sr. Universal sign bracket. 4,706,400, Cl. 40-617.000.
Howard, Edward J., Sr.: *See*—
Howard, Edward J.; and Howard, Edward J., Sr., 4,706,400, Cl. 40-617.000.
Howard, Margot O. Refrigerated cosmetic storage container. 4,706,472, Cl. 62-246.000.
Howard, Richard K.; and Marshall, Colin K., to GEC Avionics Limited. Apparatus and method for making a reflection hologram. 4,707,054, Cl. 350-3.650.
Howland, Leland L.; and Seshadri, Jayaram, to Thermo King Corporation. Compartmentalized transport refrigeration system. 4,706,468, Cl. 62-199.000.
Hoyt, Charles D.: *See*—
Nemnich, Charles; and Hoyt, Charles D., 4,706,498, Cl. 73-516.00R.
Hoyt, John G. Deck mounted lateral mast rake adjuster. 4,706,590, Cl. 114-39.100.
Hrudkova , Hana: *See*—
Janouch, Vaclav; Hrudkova , Hana; and Cefelin, Pavel, 4,707,516, Cl. 525-60.000.
Hsu, Chun: *See*—
Calabro, Salvatore; Calabro, John A.; and Hsu, Chun, 4,707,796, Cl. 364-552.000.
Hu, Hung-Tzaw, to Measurex Corporation. Process for controlling a parameter based upon filtered data. 4,707,779, Cl. 364-148.000.
Hubbell Incorporated: *See*—
Hoffman, Ernest G.; and Neuroth, David H., 4,707,568, Cl. 174-103.000.
Williams, Howard M., Jr., 4,706,831, Cl. 220-3.200.
Huber, Reinhold; and Koster, Waldemar. Joint covering for expansion joints in carriageways, especially bridges. 4,706,318, Cl. 14-16.500.
Hubin, Claude: *See*—
Danloup, Andre ; Galzandat, Pierre; Hubin, Claude; and Storino, Charles, 4,707,089, Cl. 351-138.000.
Huels Aktiengesellschaft: *See*—
Kehr, Helmut; and Denzel, Horst, 4,707,413, Cl. 428-440.000.
Huether, Werner, to MTU Moroten-und Turbinen-Union Muenchen GmbH. Sintering process for prealloyed powders. 4,707,332, Cl. 419-28.000.
Huffman, Joseph G.; and Seidl, Thomas L., to Duncan Aviation, Inc. Lightweight auxiliary power and forced air supply unit. 4,706,908, Cl. 244-118.500.
Hughes Aircraft Company: *See*—
Harvey, Robin J., 4,707,637, Cl. 315-111.810.
Marom, Emanuel, 4,707,077, Cl. 350-162.120.
Moulin, Norbert L., 4,707,068, Cl. 350-96.210.
Nudd, Graham R.; and Marom, Emanuel, 4,707,859, Cl. 382-28.000.

Hughes, David E.: *See*—
Kalaskie, William S.; and Hughes, David E., 4,706,929, Cl. 251-14.000.
Hughes, Garyth: *See*—
Gardiner, Robert W.; Viney, Brian W.; and Hughes, Garyth, 4,707,333, Cl. 420-590.000.
Hughes, Robert W., to Ingersoll-Rand Company. Two piece down hole drill chuck. 4,706,764, Cl. 175-320.000.
Hughes Tool Company: *See*—
Kovit, Sheldon L.; Tousek, Emil J.; and Douglas, Larry D., 4,707,041, Cl. 439-131.000.
Huhman, Michael L., to Deutz-Allis Corporation. Crop director for a rotary combine. 4,706,690, Cl. 130-27.00P.
Hummel, Mary: *See*—
Kieff, Elliott; Tanner, Jerome; Hummel, Mary; and Beisel, Christopher, 4,707,358, Cl. 424-89.000.
Humphrey Instruments, Inc.: *See*—
Humphrey, William E., 4,707,090, Cl. 351-211.000.
Humphrey, John R., to International Packaging Machines, Inc. Constant tension stretch wrapping machine. 4,706,443, Cl. 53-556.000.
Humphrey, William E., to Humphrey Instruments, Inc. Objective refractor for the eye. 4,707,090, Cl. 351-211.000.
Hunt, Ronald E.: *See*—
Burkhead, Herbert A.; and Hunt, Ronald E., 4,707,155, Cl. 400-199.000.
Hunter Douglas International N.V.: *See*—
Rijnders, Willem, 4,706,433, Cl. 52-473.000.
Hunter, Jennie C.; Belt, Angela; Sotos, Lynn S.; and Fonda, Michelle E., to Cetus Corporation. Fungal chloroperoxidase method. 4,707,447, Cl. 435-132.000.
Hunter, John H., to Lumonics Inc. Character imaging system. 4,707,711, Cl. 346-108.000.
Hurst, Robert N., to RCA Corporation. Compatible HDTV with increased vertical and horizontal resolution. 4,707,728, Cl. 358-12.000.
Hutchinson, Larry L.: *See*—
Frisch, Arnold M.; Hollister, Allen L.; and Hutchinson, Larry L., 4,707,834, Cl. 371-20.000.
Huth, Robert P.: *See*—
Cook, Wayne L.; and Huth, Robert P., 4,707,373, Cl. 426-540.000.
Hutton, Denis A.; and Millar, Malcolm H., to Interox Chemicals Ltd. Granular magnesium salts. 4,707,307, Cl. 260-502.00R.
Hwang, Li-Ming: *See*—
Chen, Muh-Juh; and Hwang, Li-Ming, 4,707,617, Cl. 290-55.000.
Hyakutake, Nobuo: *See*—
Terao, Kazuo; Kubo, Tsutomu; Hyakutake, Nobuo; Tachibana, Hidekiyo; Hama, Jun-ichi; Teshigawara, Touru; and Kajimoto, Masashi, 4,707,428, Cl. 430-102.000.
Hyll, John, to Baker International Corporation. Vane cone assembly for use in making centrifugal elastomeric coated impellers. 4,706,928, Cl. 249-184.000.
Hynes, Maurice A. Flexible, resilient saddle for swingjoint. 4,706,999, Cl. 285-196.000.
Hyodo, Masaya: *See*—
Tsunekawa, Masaru; Naito, Yoshihiro; Hyodo, Masaya; and Hayashi, Tatsuya, 4,706,457, Cl. 60-521.000.
Hyoki, Takuzan; Uchida, Atsushi; and Yamamoto, Yuichi, to Kabushiki Kaisha Komatsu Seisakusho; and Komatsu Zoki, Ltd. Vehicle steering and operating apparatus. 4,706,776, Cl. 180-334.000.
I.S.T. Corporation: *See*—
Sakane, Isamu; and Kawauchi, Satsuki, 4,707,387, Cl. 427-393.500.
Ichiki, Nobuhiko: *See*—
Yoshida, Kunihiko; Koshi, Kenichi; and Ichiki, Nobuhiko, 4,706,932, Cl. 251-31.000.
Ichino, Kazuo: *See*—
Yonezawa, Seiji; Ohtake, Masatoshi; Ito, Masaru; Tsuyoshi, Toshiaki; Ichino, Kazuo; and Nakagaki, Harushige, 4,707,816, Cl. 369-44.000.
Ichinose, Hisashi: *See*—
Ikeyama, Norio; Yoshioka, Noriaki; Tamaru, Shusaku; and Ichinose, Hisashi, 4,707,261, Cl. 210-433.200.
Ichiryu, Taku: *See*—
Mouri, Yasushi; Katayama, Kazuzo; Ichiryu, Taku; Mitsuhashi, Tsuneyoshi; and Kobayashi, Masanori, 4,706,969, Cl. 277-83.000.
Ide, Yukio; Ohnuma, Teruyuki; and Kageyama, Yoshiyuki, to Ricoh Company, Ltd. Manual information input device. 4,707,570, Cl. 178-18.000.
Ideal Industries, Inc.: *See*—
Blaha, William E., 4,707,567, Cl. 174-87.000.
Igarashi, Akira: *See*—
Takashima, Masanobu; Satomura, Masato; Iwakura, Ken; and Igarashi, Akira, 4,707,464, Cl. 503-216.000.
Igarashi, Toshiji, to Eisai Co., Ltd. Treating and preventing agent for ischemic cardiac disease and arrhythmia. 4,707,477, Cl. 514-218.000.
Iijima, Yoshitaka; and Noguchi, Hiroshi, to Nissan Motor Co., Ltd. Rear independent suspension for automotive vehicle. 4,706,989, Cl. 280-701.000.
Iino, Akira: *See*—
Kawazoe, Hideyo; Iino, Akira; and Orimo, Katsumi, 4,707,173, Cl. 65-3.120.
Iioka, Michihiro: *See*—
Yamada, Hiroshi; Iioka, Michihiro; Sugano, Akira; Takita, Atsushi; Nigawara, Seiitsu; and Fukai, Masayuki, 4,707,778, Cl. 364-132.000.
Iizuka, Toshimi; and Kamata, Shigeru, to Canon Kabushiki Kaisha. Lens moving device. 4,707,083, Cl. 350-429.000.
Ijichi, Masakatsu; Uehara, Yutaka; Sakaguchi, Masahiro; and Imamura, Shinichi, to Kabushiki Kaisha Ijichi Shukeijo. Stall house for livestock breeding. 4,706,607, Cl. 119-16.000.
Ikeda, Haruhiko; and Hiraishi, Shigetoshi, to Mitsubishi Paper Mills, Ltd. Heat sensitive recording material. 4,707,463, Cl. 503-209.000.
Ikeda, Masuhiro: *See*—
Yoshino, Hiroshi; Tsuchiya, Yutaka; Kaneko, Takeru; Nakazawa, Takahiro; Ikeda, Masuhiro; Araki, Shin; Yamatsu, Kiyomi; Tachibana, Shinro; and Arskawa, Yoshihiro, 4,707,468, Cl. 514-16.000.
Ikeda, Satoshi; and Suzuki, Nobukazu, to Sumitomo Metal Industries, Ltd. Steel strips with corrosion resistant surface layers having good appearance. 4,707,415, Cl. 428-621.000.
Ikeda, Yuzo: *See*—
Ohue, Kazuto; Kondou, Toshiyuki; Takeuchi, Hisaharu; and Ikeda, Yuzo, 4,707,269, Cl. 210-651.000.
Ikemori, Keiji; and Koyama, Takeshi, to Canon Kabushiki Kaisha. Optical system of variable magnification. 4,707,103, Cl. 354-403.000.
Ikeyama, Norio; Yoshioka, Noriaki; Tamaru, Shusaku; and Ichinose, Hisashi, to Nitto Electric Industrial Co., Ltd. Tubular membrane ultrafiltration module. 4,707,261, Cl. 210-433.200.
Ikimi, Yoshihiro; and Tsukada, Osamu, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Fluid-operated cylinder with cushioning flow rate control valve means. 4,706,781, Cl. 187-9.00E.
Illinois Tool Works Inc.: *See*—
Dumbovic, Steve; and Dempsky, Mark A., 4,707,782, Cl. 364-200.000.
Imai, Masao: *See*—
Ozawa, Hiroshi; Hosono, Yoichi; Hirose, Sumio; Sasagawa, Katsuyoshi; and Imai, Masao, 4,707,430, Cl. 430-270.000.
Sasagawa, Katsuyoshi; Nishihara, Kunio; Ozawa, Hiroshi; and Imai, Masao, 4,707,425, Cl. 430-21.000.
Imai, Tatsuhiko; and Kawasawa, Masuo, to Daicel Chemical Industries, Ltd. Flame retardant resin composition. 4,707,510, Cl. 524-281.000.
Imamura, Shinichi: *See*—
Ijichi, Masakatsu; Uehara, Yutaka; Sakaguchi, Masahiro; and Imamura, Shinichi, 4,706,607, Cl. 119-16.000.
IMD Corporation: *See*—
Harris, Kim A., 4,706,748, Cl. 166-173.000.
Imperial Chemical Industries PLC: *See*—
Atkinson, Peter; and Allan, Bernard D., 4,706,501, Cl. 73-730.000.
Lord, Leslie W.; Kendall, Kevin; Williams, David T.; and Bateson, John H., 4,707,351, Cl. 423-648.00R.
Reinaud, Guy F., 4,706,773, Cl. 180-169.000.
Ina, Toshikazu: *See*—
Tashiro, Syuzaburo; Ina, Toshikazu; Taguchi, Masahiro; Onimaru, Sadahisa; Nakano, Osamu; and Kuno, Akira, 4,707,788, Cl. 364-424.000.
INA Walzlager Schaeffler KG: *See*—
Kaiser, Theodor, 4,707,151, Cl. 384-495.000.
Inaba, Yoshihiro; Koshizuka, Kunihiro; Machashi, Tatsuichi; and Abe, Takao, to Konishiroku Photo Industry Co., Ltd. Thermal transfer recording medium. 4,707,406, Cl. 428-336.000.
Inagaki, Tetsuya; Aoki, Hidemi; Aikawa, Hiroyasu; and Takahashi, Masao, to Zeria Shinyaku Kogyo Kabushiki Kaisha. Cycloartenol ferulate/cyclodextrin complex. 4,707,472, Cl. 514-58.000.
Inagaki, Toshiyuki; and Maeda, Hiroaki, to Aisin Seiki Kabushiki Kaisha. Oil pressure control system for power transmissions. 4,706,549, Cl. 91-448.000.
Industrial Research Development, Inc.: *See*—
Stewart, Victor M., 4,706,418, Cl. 52-58.000.
Stewart, Victor M., 4,706,435, Cl. 52-533.000.
Ing. Rudolf Hell GmbH: *See*—
Schulz-Hennig, Joerg; and Sievers, Horst, 4,707,597, Cl. 250-209.000.
Ingersoll-Rand Company: *See*—
Hughes, Robert W., 4,706,764, Cl. 175-320.000.
Iniotakis, Nicolaos; von der Decken, Claus-Benedict; Hecker, Rudolf; Frohling, Werner; and Schulten, Rudolf, to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung. Process for separation of hydrogen and/or deuterium and tritium from an inert gas flow and apparatus for effectuation of process in the cooling gas circuit of a gas-cooled nuclear reactor. 4,707,342, Cl. 423-248.000.
Inman, Scott; and Enright, Mitchell K., to Melles Griot, Irvine Company. Vibration damped apparatus. 4,706,788, Cl. 188-378.000.
Ino, Hiromitsu: *See*—
Chiba, Kiyoshi; Ino, Hiromitsu; and Tokumitsu, Kazuto, 4,707,198, Cl. 148-304.000.
Inoh, Isamu, to Honda Giken Kogyo Kabushiki Kaisha. Striker means for automotive door latch assembly. 4,707,007, Cl. 292-341.160.
Inoue, Hidefumi; Gotoh, Yuzoh; and Ishihara, Kimio, to Jidosha Kiki Co., Ltd. Booster ratio controller for liquid pressure booster. 4,706,546, Cl. 91-370.000.
Inoue, Hiroshi, to Canon Kabushiki Kaisha. Liquid crystal panel having uniaxially-stretched substrates. 4,707,079, Cl. 350-334.000.
Inoue, Isao, to Daiya Seiko Kabushiki-Kaisha. Adjustable wrench. 4,706,528, Cl. 81-179.000.
Inoue, Manabu; Fujino, Akihiko; Hirano, Masayasu; Nakai, Masaaki; and Yoshida, Fumio, to Minolta Camera Kabushiki Kaisha. Camera having motor-driven film wind and rewind system. 4,707,104, Cl. 354-412.000.
Inoue, Shinji, to Texas Instruments Incorporated. Internal time-out circuit for CMOS dynamic RAM. 4,707,626, Cl. 307-625.000.
Inoue, Shoichi: *See*—
Hirano, Hirofumi; Nakamura, Masaaki; Hasumi, Hitoshi; Inoue, Shoichi; and Furukawa, Akiteru, 4,707,159, Cl. 400-639.100.

Inoue, Shunsaku. Golf ball. 4,706,958, Cl. 273-213.000.
Inoue, Tomohiro: *See—*
Hashimoto, Shintaro; Masuzawa, Sigeaki; Kunita, Hisao; Inoue, Tomohiro; and Nishimura, Kosuke, 4,707,794, Cl. 364-513.500.
Institut de Recherches de la Siderurgie Francaise (Irsid): *See—*
Michard, Jean A.; and De Saint-Martin, Lucien, 4,707,183, Cl. 75-10.220.
Institut National de la Sante et de la Recherche Medicale (Inserm): *See—*
Arrang, Jean-Michel; Garbarg, Monique; Lancelot, Jean-Charles; Lecomte, Jeanne-Marie; Robba, Max-Fernand; and Schwartz, Jean-Charles, 4,707,487, Cl. 514-326.000.
Instrumed, Inc.: *See—*
Spence, Jerry L., 4,706,839, Cl. 220-315.000.
Intellicard International, Inc.: *See—*
Roth, Gary L., 4,707,594, Cl. 235-488.000.
Interatom GmbH: *See—*
Reutler, Herbert; and Ullrich, Manfred, 4,707,327, Cl. 376-294.000.
International Business Machines Corporation: *See—*
Asthony, Bruce O., Jr.; Heise, Thomas M.; and Sheppard, Frank P., 4,707,803, Cl. 364-900.000.
Barnes, Johnny G.; Chen, James N.; and Hayes, Gerald E., 4,707,801, Cl. 364-900.000.
Bertach, John E., 4,707,667, Cl. 330-9.000.
Burkhead, Herbert A.; and Hunt, Ronald E., 4,707,155, Cl. 400-199.000.
Capwell, Robert J.; Kaschak, Ronald A.; McBride, Donald G.; Rickert, Robert G.; and Seraphim, Donald P., 4,707,377, Cl. 427-8.000.
Eggenberger, John S.; and Patel, Arvind M., 4,707,681, Cl. 340-347.0DD.
Friehauf, William J.; Janssen, Donovan M.; Kirton, Alan J.; Nard, Michael E.; and Rose, Leroy, 4,707,753, Cl. 360-106.000.
Giammarco, Nicholas J.; Gimpelson, Alexander; Kaplita, George A.; Lopata, Alexander D.; Scaduto, Anthony F.; and Shepard, Joseph F., 4,707,218, Cl. 156-643.000.
Jones, Pamela K., 4,706,577, Cl. 109-59.00T.
McBride, Donald G.; and Rickert, Robert G., 4,707,378, Cl. 427-8.000.
International Fuel Cells Corporation: *See—*
Taylor, William A.; and Abrams, Martin L., 4,706,737, Cl. 165-47.000.
International Minerals & Chemical Corp.: *See—*
Myers-Keith, Paula, 4,707,492, Cl. 514-450.000.
International Packaging Machines, Inc.: *See—*
Humphrey, John R., 4,706,443, Cl. 53-556.000.
Interox Chemicals Ltd.: *See—*
Hutton, Denis A.; and Millar, Malcolm H., 4,707,307, Cl. 260-502.00R.
Inuzuka, Tsuneki; Kawatsura, Yoshihiro; and Ishida, Masato, to Canon Kabushiki Kaisha. Image formation apparatus including means for manually and automatically feeding copy therethrough. 4,707,111, Cl. 355-8.000.
Inventive Packaging Corporation: *See—*
Cooke, Carl W., 4,706,837, Cl. 220-270.000.
Ionics Incorporated: *See—*
Parsi, Edgardo J.; Sims, Keith J.; and Goldstein, Arthur L., 4,707,240, Cl. 204-290.00F.
Iovine, Carmine P.: *See—*
Leighton, John C.; and Iovine, Carmine P., 4,707,306, Cl. 260-501.120.
Irlam, Geoffrey; and Smith, Ian J., to Lever Brothers Company. Process for preparing detergent bars. 4,707,288, Cl. 252-121.000.
Irvin Industries, Inc.: *See—*
Gavagan, James A., 4,707,018, Cl. 296-976.000.
Isaacson, Philip O.: *See—*
Coulter, Thomas R.; Isaacson, Philip O.; and Thiede, Edwin C., 4,707,697, Cl. 342-25.000.
Isayama, Katsuhiko: *See—*
Sasaki, Makoto; Yamakawa, Masaki; Hirose, Toshifumi; and Isayama, Katsuhiko, 4,707,526, Cl. 525-404.000.
Ishibane, Kyuhei: *See—*
Oguni, Kensaku; Ishibane, Kyuhei; Kuroda, Shigeaki; Yasuda, Hiromu; Sano, Takashi; and Etou, Hironori, 4,706,469, Cl. 62-222.000.
Ishida, Masato: *See—*
Inuzuka, Tsuneki; Kawatsura, Yoshihiro; and Ishida, Masato, 4,707,111, Cl. 355-8.000.
Ishida, Takashi, to Kabushiki Kaisha Daini Seikosha. Electronic timepiece. 4,707,145, Cl. 368-201.000.
Ishihara, Kimio: *See—*
Inoue, Hidefumi; Gotoh, Yuzoh; and Ishihara, Kimio, 4,706,546, Cl. 91-370.000.
Ishii, Jun: *See—*
Mikami, Mitsugu; Yukimoto, Kougi; and Ishii, Jun, 4,706,795, Cl. 194-317.000.
Ishii, Kazuhiro; Uno, Tetsuya; Kato, Masaki; and Kobayashi, Masao, to Mitsubishi Rayon Co., Ltd. Method for regenerating phosphorus-molybdenum-alkali containing oxidation catalyst. 4,707,460, Cl. 502-26.000.
Ishii, Kazuyoshi: *See—*
Shinyagaito, Tatsuya; Kuramoto, Terumasa; Machida, Toyotaka; Saito, Kikuji; Shichijo, Shunichi; Yamagishi, Tooru; Ishii, Kazuyoshi; Kobayashi, Yoshinao; and Hirata, Atsumi, 4,707,733, Cl. 358-342.000.
Ishii, Kiminori: *See—*
Toyama, Takashi; Ohno, Masashi; Ishii, Kiminori; Yamamoto, Shosaku; and Kakinuma, Kazuo, 4,707,381, Cl. 427-407.100.
Ishikawa, Hikaru: *See—*
Morimura, Yasuhiro; Fukuura, Yukio; Ishikawa, Hikaru; Tanuma, Itsuo; and Honda, Toshio, 4,707,397, Cl. 428-216.000.
Ishikawa, Kazuhiko: *See—*
Takazume, Masafumi; and Ishikawa, Kazuhiko, 4,707,588, Cl. 219-400.000.
Ishikawa, Tadashi; and Eguchi, Kazutoshi, to Kabushiki Kaisha Toshiba. Bit sliced decimal adding/subtracting unit for multi-digit decimal addition and subtraction. 4,707,799, Cl. 364-771.000.
Ishikawa, Wataru: *See—*
Hayakawa, Masatoshi; Aso, Koichi; Ochiai, Yoshitaka; Matsuda, Hideki; Hayashi, Kazuhiko; Ishikawa, Wataru; and Iwasaki, You, 4,707,417, Cl. 428-630.000.
Ishiwaka, Takumi: *See—*
Iwasawa, Shigeru; and Ishiwaka, Takumi, 4,707,408, Cl. 428-379.000.
Iten, Clemens A., to American Safety Razor Company. One piece razor blade holder. 4,706,385, Cl. 30-169.000.
ITI/CLM Impianti Technici Industriali SpA: *See—*
Cicin-Sain, Ivo, 4,706,395, Cl. 37-105.000.
Ito, Eizo, to Mitsubishi Denki Kabushiki Kaisha. Fluorescent coating for uv sensitive semiconductor device. 4,707,725, Cl. 357-72.000.
Ito, Hideo: *See—*
Tsuchida, Shin; and Ito, Hideo, 4,707,195, Cl. 148-11.50A.
Ito, Ken, to Nissan Motor Co., Ltd. Vehicular rear wheel steer angle control system. 4,706,978, Cl. 280-91.000.
Ito, Ken: *See—*
Kawabe, Taketoshi; and Ito, Ken, 4,706,979, Cl. 280-91.000.
Kawabe, Taketosi; and Ito, Ken, 4,706,771, Cl. 180-142.000.
Ito, Masaru: *See—*
Yonezawa, Seiji; Ohtake, Masatoshi; Ito, Masaru; Tsuyoshi, Toshiaki; Ichino, Kazuo; and Nakagaki, Harushige, 4,707,816, Cl. 369-44.000.
Ito, Takayasu: *See—*
Nishijima, Hideo; Okamoto, Kaneyuki; Ito, Takayasu; and Toyoshima, Shuji, 4,707,749, Cl. 360-14.300.
Itoh, Hayami: *See—*
Nakaoji, Kazuhiko; Kamao, Mitsugu; Itoh, Hayami; Tatsumi, Shuhei; and Takao, Shoichi, 4,706,891, Cl. 241-16.000.
Itoh, Kunio; Okada, Fumio; Yamamoto, Yasushi; and Aoki, Hisashi, to Shin-Etsu Chemical Co., Ltd. Radiation-curable organopolysiloxane compositions. 4,707,503, Cl. 522-99.000.
Itoh, Takayuki, to Asahi Kogaku Kogyo Kabushiki Kaisha. Variable magnification copying lens system. 4,707,082, Cl. 350-425.000.
ITT Corporation: *See—*
Kamentser, Boris A., 4,706,503, Cl. 73-861.240.
Iwakura, Ken: *See—*
Takashima, Masanobu; Satomura, Masato; Iwakura, Ken; and Igarashi, Akira, 4,707,464, Cl. 503-216.000.
Iwasaki, Akira: *See—*
Ukai, Norio; and Iwasaki, Akira, 4,706,977, Cl. 280-91.000.
Iwasaki, You: *See—*
Hayakawa, Masatoshi; Aso, Koichi; Ochiai, Yoshitaka; Matsuda, Hideki; Hayashi, Kazuhiko; Ishikawa, Wataru; and Iwasaki, You, 4,707,417, Cl. 428-630.000.
Iwasawa, Shigeru; and Ishiwaka, Takumi, to Bridgestone Corporation. Roll for use in business machine. 4,707,408, Cl. 428-379.000.
Iwata, Satoshi: *See—*
Toida, Akikazu; Iwata, Satoshi; Takahashi, Fumio; and Mimura, Takanobu, 4,707,703, Cl. 346-1.100.
Iwatsuji, Ichirou: *See—*
Hara, Zenichirou; and Iwatsuji, Ichirou, 4,707,638, Cl. 315-169.300.
Izawa, Hideo: *See—*
Kishine, Toshiaki; Izawa, Hideo; and Ohba, Masaru, 4,706,566, Cl. 101-426.000.
J. I. Case Company: *See—*
Harms, John R.; and Anderson, Ronald L., 4,706,762, Cl. 172-684.500.
J. M. Voith GmbH: *See—*
Mullner, Josef; Schiel, Christian; and Steiner, Karl, 4,707,222, Cl. 162-205.000.
Jaatinen, Jarl: *See—*
Miemela, Pentti; and Jaatinen, Jarl, 4,707,603, Cl. 250-339.000.
Jackson, Charleston W. Leg movement restraining device for training athletes. 4,706,957, Cl. 273-188.00R.
Jackson, David A.: *See—*
Jones, Julian D. C.; Jackson, David A.; and Leilabady, Pedram A., 4,706,502, Cl. 73-861.240.
Jackson, Robert E.: *See—*
Jones, Emrys H., Jr.; and Jackson, Robert E., 4,706,492, Cl. 73-3.000.
Jacober, Jeffrey M., to Sport Graphics, Inc. Backpack with removable insulated container. 4,706,856, Cl. 224-151.000.
Jacobs Manufacturing Company, The: *See—*
Meistrick, Zdenek S.; and Quenneville, Raymond N., 4,706,624, Cl. 123-321.000.
Meistrick, Zdenek S.; and Price, Robert B., 4,706,625, Cl. 123-321.000.
Jacobsen, William M.; and Parker, Andrew L., to Jacobsen, William M. Fastener implanting machine for ground erosion covers. 4,706,864, Cl. 227-109.000.

Jacquier, Paul: *See*—
Bianchi, Claude; Fournier, Ives; and Jacquier, Paul, 4,706,356, Cl. 29-157.400.

Jagenberg Aktiengesellschaft: *See*—
Wohlfeil, Gerhard, 4,706,603, Cl. 118-410.000.

Jahn, Hans-Georg, to Heidelberger Druckmaschinen AG. Device for applying medium after termination of the printing operation in a printing machine. 4,706,601, Cl. 118-46.000.

Jahr, Ronald S.; and Cowell, Thomas H., to Systems and Support, Incorporated. Utility usage data and event data acquisition system. 4,707,852, Cl. 379-107.000.

James, Barry A. Interlocking plastic shelving system. 4,706,576, Cl. 108-111.000.

James, Kenneth S. Smoke detector-activated door seal. 4,706,413, Cl. 49-477.000.

James River-Norwalk, Inc.: *See*—
Schulz, Werner, 4,706,873, Cl. 229-1.50B.

Jamieson, Peter B.: *See*—
Lyons, Thomas D.; and Jamieson, Peter B., 4,707,435, Cl. 430-494.000.

Janke, Donald E.; and Linstromberg, William J., to Whirlpool Corporation. Alarm for a refrigerator. 4,707,684, Cl. 340-530.000.

Janome Sewing Machine Co. Ltd.: *See*—
Ozaki, Yoshiaki; and Takanashi, Mahito, 4,707,751, Cl. 360-97.000.

Janouch, Vaclav; Hrudkova , Hana; and Cefelin, Pavel, to Ceskoslovenskla akademie ved. Polymeric sulfoxide based on the polymer of vinylalcohol. 4,707,516, Cl. 525-60.000.

Janssen, Donovan M.: *See*—
Friehauf, William J.; Janssen, Donovan M.; Kirton, Alan J.; Nard, Michael E.; and Rose, Leroy, 4,707,753, Cl. 360-106.000.

Janssen, Heinz-Uwe: *See*—
Spoeler, Johannes-Gerhard; and Janssen, Heinz-Uwe, 4,706,782, Cl. 187-20.000.

Japan Styrene Paper Corporation: *See*—
Yoshimura, Shohei; Fujimura, Shigeki; and Sakamoto, Itaru, 4,707,569, Cl. 174-116.000.

Jarosinski, Louis. Bathtub unit with improved user features. 4,706,311, Cl. 4-546.000.

Jasper, Edward P.: *See*—
Gessel, James M.; Jasper, Edward P.; and Kunz, Gary L., 4,706,448, Cl. 56-400.000.

Jeffress, William L. Detachable handle extender and transverse enlarger for use with longitudinally reciprocable handles or plungers by handicapped persons. 4,706,598, Cl. 16-112.000.

Jeffs, David H.; and Jessop, Paul M., to Multi-Technology, Inc. Medical micro pipette tips for difficult to reach places and related methods. 4,707,337, Cl. 422-100.000.

Jencek, Premysl, to Rockwell International Corporation. Extendible rocket-engine nozzle. 4,706,886, Cl. 239-265.330.

Jenkins, Jerry V.; Sloan, Haskell F.; Frenkel, Robert L.; and Zielinski, Albert, to Golden Aluminum Company. Container scanning and accounting device. 4,707,251, Cl. 209-569.000.

Jenkins, Peter D., to British Telecommunications. Optical fibre sealing assembly. 4,707,065, Cl. 350-96.200.

Jenkins, Richard A., to Moore Business Forms, Inc. Windowed mailer with return envelope for remittance document, having return mail-to address exposed by removal of original mail-to label. 4,706,877, Cl. 229-73.000.

Jessen, Gilbert W.: *See*—
Thorsen, Niels P.; Jessen, Gilbert W.; Thomsen, Erik; and Sorensen, Jens R., 4,706,467, Cl. 62-139.000.

Jessop, Paul M.: *See*—
Jeffs, David H.; and Jessop, Paul M., 4,707,337, Cl. 422-100.000.

Jewell, J. N.; Korte, K. R.; Marshall, R. H.; and Zipperle, Kevin A., to Brown & Williamson Tobacco Corporation. Tobacco treating process. 4,706,691, Cl. 131-300.000.

Jidosha Kiki Co., Ltd.: *See*—
Bandou, Masaaki; Sugita, Masao; and Marumo, Takachi, 4,706,487, Cl. 72-355.000.
Inoue, Hidefumi; Gotoh, Yuzoh; and Ishihara, Kimio, 4,706,546, Cl. 91-370.000.

Jimenez, Ivan; and Rubin, Irving N. Firearm sight and flashlight mounting system. 4,707,772, Cl. 362-110.000.

JM Industries, Inc.: *See*—
Martin, R. Craig, 4,706,399, Cl. 40-584.000.

Jockey International, Inc.: *See*—
Kohls, Mitchell L.; Smith, Loren G.; and Zahringer, H. David, 4,706,821, Cl. 211-593.000.

Joffee, Irving B.: *See*—
Degen, Peter J.; Joffee, Irving B.; and Gsell, Thomas C., 4,707,266, Cl. 210-638.000.

Joh, Yasushi; and Nagase, Toshio, to Nippon Zeon Co., Ltd. Method of making a blood pump. 4,707,315, Cl. 264-129.000.

Johansson, Paul J. Mobile rocking wheelchair with position locking means. 4,707,026, Cl. 297-281.000.

Johansson, Sven H.; and Nytomt, Jan G., to Saab-Scania Aktiebolag. Ignition unit in the ignition system of an internal combustion engine. 4,706,638, Cl. 123-647.000.

John A. Kitchen Ltd.: *See*—
Kitchen, John A., 4,706,390, Cl. 34-57.00R.

John Fluke Mfg. Co., Inc.: *See*—
Sparrowhawk, Bryan L., 4,707,680, Cl. 340-347.0NT.
Whipple, Charles K., 4,707,039, Cl. 439-75.000.

John Wyeth & Brother Limited: *See*—
Shepherd, Robin G., 4,707,552, Cl. 546-176.000.

Johns, William L.: *See*—
Vranish, John M.; Bunch, Wayne R.; and Johns, William L., 4,707,013, Cl. 294-119.100.

Johnson, Bruce K.; Estevez, Juan; Goward, Robert M.; and Whiteside, George D., to Polaroid Corporation. Multiple format camera and accessory. 4,707,106, Cl. 354-481.000.

Johnson, Bruce S., to Harsco Corporation. Portable folding bridge crane. 4,706,825, Cl. 212-182.000.

Johnson, Burnett H., to Exxon Research & Engineering Co. Polymerization catalyst. 4,707,530, Cl. 526-129.000.

Johnson, Daniel C.; and Brummel, David J., to Maremont Corporation. Tool for removal of rubber exhaust hangers. 4,706,358, Cl. 29-235.000.

Johnson, David E., to Faria, John R. Boat cockpit enclosure. 4,706,599, Cl. 114-361.000.

Johnson, David W., Jr.; MacChesney, John B.; Rabinovich, Eliezer M.; and Vogel, Eva M., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Fabrication of high-silica glass article. 4,707,174, Cl. 65-18.100.

Johnson, Frederick W., to Seal-Tech, Inc. Liner connection. 4,707,001, Cl. 285-332.300.

Johnson, Homer K., to Dow Chemical Company, The. Device and method for separating individual fluids from a mixture of fluids. 4,707,267, Cl. 210-650.000.

Johnson, John L.: *See*—
Schmidt, Albert L.; Sherwin, Gary W.; Blackham, Kenneth K.; and Johnson, John L., 4,706,679, Cl. 128-639.000.

Johnson & Johnson Products, Inc.: *See*—
Thompson, Darrell R., 4,706,662, Cl. 128-155.000.
Wareing, Mark V., 4,706,830, Cl. 215-365.000.

Johnson, Vincent L.; and Moser, Kurt, to Dow Chemical Company, The. High-pressure mixing head. 4,707,339, Cl. 422-133.000.

Johnson, Wilfred V., to U.S. Fire Control Corporation. Automatic on-off sprinkler head. 4,706,758, Cl. 169-19.000.

Johnsson, Rolf. Filtering device for vehicle exhaust. 4,706,455, Cl. 60-311.000.

Jolson, Joseph D.: *See*—
Schneider, Alan A.; Stewart, David A.; Jolson, Joseph D.; Auel, RaeAnn M.; and Price, John F., 4,707,242, Cl. 204-412.000.

Jonak, Vladimir, to Alfa-Laval Marine & Power Engineering AB. Flow indicating device and method. 4,706,504, Cl. 73-861.580.

Jones, Alun G.; Davison, Alan; and Abrams, Michael J., to President and Fellows of Harvard College; and Massachusetts Institute of Technology. Metal-isonitrile adducts for preparing radionuclide complexes for labelling and imaging agents. 4,707,544, Cl. 534-14.000.

Jones, David J. Tubular garment. 4,706,304, Cl. 2-91.000.

Jones, Emrys H., Jr.; and Jackson, Robert E., to Chevron Research Company. Method and apparatus for determining real gas effects in critical flow nozzles. 4,706,492, Cl. 73-3.000.

Jones, Julian D. C.; Jackson, David A.; and Leilabady, Pedram A., to Kent Scientific and Industrial Projects Limited. Vortex shedding flowmeter. 4,706,502, Cl. 73-861.240.

Jones, Pamela K., to International Business Machines Corporation. Safe door latch deformation actuated interlock. 4,706,577, Cl. 109-59.00T.

Jones, Robert C. Therapeutic thermal transfer device. 4,706,672, Cl. 128-379.000.

Jones, Thomas P., to Lion Laboratories Limited. Apparatus for gas analysis. 4,707,336, Cl. 422-84.000.

Jones, William C.: *See*—
Jones, William C., Jr.; and Jones, William C., 4,706,685, Cl. 128-725.000.

Jones, William C., Jr.; and Jones, William C. Spirometer with double rolling seals. 4,706,685, Cl. 128-725.000.

Joseph, Brian J., to Eastman Kodak Company. Electrophotographic development apparatus with an improved ribbon blender. 4,707,107, Cl. 355-3.0DD.

Joslin, Paul C.: *See*—
Etherington, Harry J. C.; Joslin, Paul C.; Carr, David E.; and Simpson-Davis, Raymond, 4,707,573, Cl. 178-18.000.

JTG of Nashville, Inc.: *See*—
Sanders, Sam, 4,706,536, Cl. 84-1.010.

Jumeau, Elizabeth J., to BOC Group, Inc., The. Valve arrangement. 4,706,700, Cl. 137-247.290.

Jung, James E.; Koors, Mark A.; and Lutz, Phillip A., to General Motors Corporation. Surface mount package for encapsulated tape automated bonding integrated circuit modules. 4,706,811, Cl. 206-331.000.

Junkers, John K. Fluid operated wrench. 4,706,526, Cl. 81-57.390.

Junkers, John K. Fluid operated wrench for tightening or loosening a threaded connector. 4,706,527, Cl. 81-57.390.

Junkosha Co., Ltd.: *See*—
Suzuki, Hirosuke; and Umebayashi, Tetsuro, 4,707,671, Cl. 333-1.000.

K. S. Macey Machine Company, Inc.: *See*—
Ruetschle, Rudolph H.; and Macey, Keith S., 4,706,950, Cl. 270-54.000.

Kable, Robert G.; and Schlosser, Philip A., to Scriptel Corporation. Tracer for electrographic surfaces. 4,707,572, Cl. 178-18.000.

Kabushiki Kaisha Daini Seikosha: *See*—
Ishida, Takashi, 4,707,145, Cl. 368-201.000.

Kabushiki Kaisha Ijichi Shukeijo: *See*—
Ijichi, Masakatsu; Uehara, Yutaka; Sakaguchi, Masahiro; and Imamura, Shinichi, 4,706,607, Cl. 119-16.000.

Kabushiki Kaisha Komatsu Seisakusho: *See*—
Hyoki, Takuzan; Uchida, Atsushi; and Yamamoto, Yuichi, 4,706,776, Cl. 180-334.000.

Yoshimitsu, Toshio, 4,706,616, Cl. 123-41.840.
Kabushiki Kaisha Machida Seisakusho: *See*—
Miyagi, Kunihiko, 4,706,657, Cl. 128-6.000.
Kabushiki Kaisha Meidensha: *See*—
Tamaki, Nobuaki; Sakuma, Shinzo; Fukai, Toshimasa; and Takihana, Masatoshi, 4,707,577, Cl. 200-144.00B.
Kabushiki Kaisha Nipponcoinco: *See*—
Mikami, Mitsugu; Yukimoto, Kougi; and Ishii, Jun, 4,706,795, Cl. 194-317.000.
Kabushiki Kaisha Sankyo Seiki Seisakusho: *See*—
Yasukawa, Kazuyoshi, 4,706,515, Cl. 74-479.000.
Kabushiki Kaisha Tokai-rika-denki-seisakusho: *See*—
Tamura, Keiichi, 4,706,993, Cl. 280-808.000.
Kabushiki Kaisha Toshiba: *See*—
Fukushima, Eiji; Tanaka, Minoru; Sanada, Kazuo; and Chigira, Sadao, 4,707,075, Cl. 350-96.260.
Harada, Kentaro; and Watanabe, Junji, 4,707,110, Cl. 355-7.000.
Hasegawa, Iwao, 4,707,853, Cl. 379-221.000.
Hopkinson, James F.; and Nambu, Kyojiro, 4,707,822, Cl. 364-414.000.
Ishikawa, Tadashi; and Eguchi, Kazutoshi, 4,707,799, Cl. 364-771.000.
Miura, Kunihiko, 4,707,715, Cl. 346-160.000.
Ohno, Tadayoshi, 4,707,707, Cl. 346-76.0PH.
Shirai, Koji; and Kawamura, Ken, 4,707,720, Cl. 357-53.000.
Takagi, Eizi, 4,707,012, Cl. 294-64.100.
Tamaru, Kiichiro, 4,707,833, Cl. 371-15.000.
Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See*—
Ikimi, Yoshihiro; and Tsukada, Osamu, 4,706,781, Cl. 187-9.00E.
Tsunekawa, Masaru; Naito, Yoshihiro; Hyodo, Masaya; and Hayashi, Tatsuya, 4,706,457, Cl. 60-521.000.
Kabuto, Hiroaki: *See*—
Takenaka, Kiyoshi; Ohtsuji, Masahiko; and Kabuto, Hiroaki, 4,707,117, Cl. 355-3.0SH.
Kadomatsu, Yasuo: *See*—
Tajima, Shoji; Kadomatsu, Yasuo; Miyazaki, Yoshio; Sakurai, Michikazu; and Anze, Kimio, 4,707,382, Cl. 427-58.000.
Kageyama, Yoshiyuki: *See*—
Ide, Yukio; Ohnuma, Teruyuki; and Kageyama, Yoshiyuki, 4,707,570, Cl. 178-18.000.
Kagiwada, Reynold S.: *See*—
Stokes, Robert B.; Yen, Kuo-Hsiung; Lau, Kei-Fung; Kagiwada, Reynold S.; and Delaney, Michael J., 4,707,631, Cl. 310-313.00A.
Kai, Shisei: *See*—
Nakagawa, Toyoaki; and Kai, Shisei, 4,707,241, Cl. 204-406.000.
Kaimai, Takashi; and Kusayanagi, Sampo, to Nippon Mining Co., Ltd. Lubricating oil for use in Flon atmosphere. 4,707,280, Cl. 252-49.600.
Kaindl, Michael: *See*—
Falkenstein, Rudolf; Haberland, Detlef; Kaindl, Michael; Haltenorth, Helmut; Prussas, Herbert; and Taumberger, Franz, 4,707,066, Cl. 350-96.200.
Kaiser, Carl; and Kruse, Lawrence I., to Smithkline Beckman Corporation. Substituted te[1]trahydroisoquinoline derivatives having β-adrenergic receptor activity. 4,707,485, Cl. 514-307.000.
Kaiser, Carl; and Kruse, Lawrence I., to Smithkline Beckman Corporation. Dopamine-β-hydroxylase inhibitors and use thereof. 4,707,488, Cl. 514-381.000.
Kaiser Steel Corporation: *See*—
Williamson, Calvin C., 4,706,488, Cl. 72-370.000.
Kaiser, Theodor, to INA Walzlager Schaeffler KG. Radial rolling bearings. 4,707,151, Cl. 384-495.000.
Kaiya, Haruhiko: *See*—
Ogiu, Hisao; and Kaiya, Haruhiko, 4,706,654, Cl. 128-4.000.
Kajimoto, Masashi: *See*—
Terao, Kazuo; Kubo, Tsutomu; Hyakutake, Nobuo; Tachibana, Hidekiyo; Hama, Jun-ichi; Teshigawara, Touru; and Kajimoto, Masashi, 4,707,428, Cl. 430-102.000.
Kajita, Takeyoshi, to Mitsubishi Denki Kabushiki Kaisha. Flywheel power source apparatus. 4,707,774, Cl. 363-37.000.
Kajiwara, Toshiyuki; Kimura, Tomoaki; and Nihei, Mitsuo, to Hitachi, Ltd. Method of continuously hot-rolling steel pieces. 4,706,871, Cl. 228-158.000.
Kakinuma, Kazuo: *See*—
Toyama, Takashi; Ohno, Masashi; Ishii, Kiminori; Yamamoto, Shosaku; and Kakinuma, Kazuo, 4,707,381, Cl. 427-407.100.
Kakis, Frederic J. Food dehydration process. 4,707,370, Cl. 426-443.000.
Kakizaki, Takehiro; Araki, Shoji; and Numata, Shinichi, to Sony Corporation. Cathode ray tube. 4,707,634, Cl. 313-432.000.
Kalaskie, William S.; and Hughes, David E., to Stanley G. Flagg & Co., Inc. Pneumatically operated valve with manual override and lockout. 4,706,929, Cl. 251-14.000.
Kali und Salz: *See*—
Vajna, Sandor; and Peuschel, Gerd, 4,707,347, Cl. 423-552.000.
Kalmijn, Hilco T.: *See*—
Kemner, Rudolf; Kalmijn, Hilco T.; and Van Heelsbergen, Teunis R., 4,707,662, Cl. 324-318.000.
Kalnin, Ilmar L.; and Goldberg, Harris A., to Celanese Corporation. Electric storage battery and process for the manufacture thereof. 4,707,423, Cl. 429-112.000.
Kamao, Mitsugu: *See*—
Nakaoji, Kazuhiko; Kamao, Mitsugu; Itoh, Hayami; Tatsumi, Shuhei; and Takao, Shoichi, 4,706,891, Cl. 241-16.000.
Kamata, Seizo: *See*—
Ohkochi, Katsutoshi; Shinozaki, Mamoru; Ohshita, Toshiyuki; Kitano, Masayasu; and Kamata, Seizo, 4,706,753, Cl. 166-286.000.
Kamata, Shigeru: *See*—
Iizuka, Toshimi; and Kamata, Shigeru, 4,707,083, Cl. 350-429.000.
Kamentser, Boris A., to ITT Corporation. Vortex meter sensor. 4,706,503, Cl. 73-861.240.
Kan, Kwok-Ning S., to L & F Industries. Jaw assembly for stretch press. 4,706,486, Cl. 72-302.000.
Kanai, Mitsuharu: *See*—
Akutsu, Mitsuo; and Kanai, Mitsuharu, 4,707,507, Cl. 524-99.000.
Kanaoka, Chikao: *See*—
Saito, Kenichiro; Kanaoka, Chikao; and Aoyama, Shigeyuki, 4,707,167, Cl. 55-267.000.
Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See*—
Sasaki, Makoto; Yamakawa, Masaki; Hirose, Toshifumi; and Isayama, Katsuhiko, 4,707,526, Cl. 525-404.000.
Kaneko, Takeru: *See*—
Yoshino, Hiroshi; Tsuchiya, Yutaka; Kaneko, Takeru; Nakazawa, Takahiro; Ikeda, Masuhiro; Araki, Shin; Yamatsu, Kiyomi; Tachibana, Shinro; and Arakawa, Yoshihiro, 4,707,468, Cl. 514-16.000.
Kanemasa, Akira, to NEC Corporation. Method and apparatus for cancelling echo. 4,707,824, Cl. 370-32.100.
Kanemura, Shoji, to Canon Kabushiki Kaisha. Motor controlling system. 4,707,649, Cl. 318-685.000.
Kanno, Hideo: *See*—
Okano, Hiroshi; Kanno, Hideo; and Ohmori, Sachio, 4,707,100, Cl. 354-273.000.
Kanno, Masashi; Komori, Katsufumi; Tatekawa, Masaichirou; Miwa, Kiyohito; and Takaoka, Iwane, to Matsushita Electric Industrial Co., Ltd. Electrophotographic apparatus capable of editing a copy picture image. 4,707,109, Cl. 355-7.000.
Kansaka Co., Ltd.: *See*—
Ohashi, Yoshio, 4,706,780, Cl. 182-93.000.
Kao Corporation: *See*—
Nakaoji, Kazuhiko; Kamao, Mitsugu; Itoh, Hayami; Tatsumi, Shuhei; and Takao, Shoichi, 4,706,891, Cl. 241-16.000.
Sano, Tomohiko; Fujisawa, Noriyoshi; Fukuda, Masataka; and Suganuma, Tsuyoshi, 4,707,292, Cl. 252-174.160.
Kaplita, George A.: *See*—
Giammarco, Nicholas J.; Gimpelson, Alexander; Kaplita, George A.; Lopata, Alexander D.; Scaduto, Anthony F.; and Shepard, Joseph F., 4,707,218, Cl. 156-643.000.
Kardon Industries: *See*—
Zinnbauer, Gerald, 4,706,828, Cl. 215-246.000.
Karl Eybl Gesellschaft m.b.H.: *See*—
Schmidt, Walter R., 4,706,474, Cl. 66-9.00B.
Karl Lautenschlager GmbH & Co. KG: *See*—
Lautenschlager, Karl, Jr., 4,706,332, Cl. 16-241.000.
Kasahara, Seitaro: *See*—
Sawaki, Akira; and Kasahara, Seitaro, 4,707,121, Cl. 355-40.000.
Kasai, Shin; Waketa, Hideharu; Kato, Keiichi; and Kawaguchi, Yutaka, to Nitto Boseki Co., Ltd. Substrate for printed circuit. 4,707,565, Cl. 174-68.500.
Kasanami, Mitsuru; and Tamura, Hideyuki, to Nissan Motor Company, Limited. Fuel control apparatus for internal combustion engine. 4,706,632, Cl. 123-492.000.
Kaschak, Ronald A.: *See*—
Capwell, Robert J.; Kaschak, Ronald A.; McBride, Donald G.; Rickert, Robert G.; and Seraphim, Donald P., 4,707,377, Cl. 427-8.000.
Kasik, Pavel: *See*—
Neufuss, Karel; Macku, Ales; Forejt, Antonin; and Kasik, Pavel, 4,707,379, Cl. 427-34.000.
Kassai, Kenzou, to Aprica Kassai Kabushikikaisha. Mechanism for locking opened state of baby carriage. 4,706,986, Cl. 280-642.000.
Kataoka, Takeshi: *See*—
Saitou, Yosio; Kataoka, Takeshi; Takechi, Moriaki; and Matsumoto, Takahiro, 4,707,676, Cl. 335-216.000.
Katayama, Kazuzo: *See*—
Mouri, Yasushi; Katayama, Kazuzo; Ichiryu, Taku; Mitsuhashi, Tsuneyoshi; and Kobayashi, Masanori, 4,706,969, Cl. 277-83.000.
Kato, Hiroshi: *See*—
Tateyama, Norihiro; Yamazaki, Kazuo; Kato, Hiroshi; and Teshima, Haruhito, 4,707,635, Cl. 313-466.000.
Kato, Keiichi: *See*—
Kasai, Shin; Waketa, Hideharu; Kato, Keiichi; and Kawaguchi, Yutaka, 4,707,565, Cl. 174-68.500.
Kato, Masaki: *See*—
Ishii, Kazuhiro; Uno, Tetsuya; Kato, Masaki; and Kobayashi, Masao, 4,707,460, Cl. 502-26.000.
Kato, Matsuo; Ohtsuki, Tomonari; Hashimoto, Kazuya; and Nakaide, Masami, to Daiichi Denshi Kogyo Kabushiki Kaisha; and Hitachi, Ltd. Multi contact connector having ground terminal block connected with tape wires and method of connecting tape wires to multi contact connector. 4,706,381, Cl. 29-857.000.
Kato, Mikihiko; Okuzawa, Yasutoshi; Komine, Shigeo; and Morita, Kazuhiko, to Fuji Photo Film Co., Ltd. Flexible magnetic disk. 4,707,392, Cl. 428-65.000.
Katsuki, Hiroshi; and Daimon, Akio, to Sumitomo Chemical Company, Limited. Resin composition for soft bumpers. 4,707,514, Cl. 524-505.000.

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Kaup, Friedel: *See*—
Warnke, Heinrich; Kaup, Friedel; Bersch, Bernhard; Mertinkat, Willi; and Tenhaves, Ulrich, 4,707,385, Cl. 427-374.100.

Kavanagh, Gary A.: *See*—
Horvath, Zoltan L.; Kavanagh, Gary A.; Manning, Steven F.; Pyszel, Ronald J.; Rogers, Lloyd W.; and Schlaps, Edgar H., 4,707,027, Cl. 297-284.000.

Kawabe, Taketoshi; and Ito, Ken, to Nissan Motor Co., Ltd. Steering control system for wheeled vehicle. 4,706,979, Cl. 280-91.000.

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Adachi, Toshio; Aoyagi, Toru; Kawaguchi, Akihisa; and Yamanaka, Shigeki, 4,706,419, Cl. 52-65.000.

Kawaguchi, Yutaka: *See*—
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Kawakami, Naoya: *See*—
Akazawa, Naoki; Nishi, Kazuhiko; Kawakami, Naoya; Fujisawa, Yoshiaki; and Yamada, Noriyoshi, 4,706,470, Cl. 62-209.000.

Kawamata, Syooichi: *See*—
Takahashi, Tadashi; Miyashita, Kunio; and Kawamata, Syooichi, 4,707,695, Cl. 340-870.310.

Kawamoto, Yoshimichi; Furukawa, Yoshimi; Hamada, Tetsuro; and Serizawa, Mitsuya, to Honda Giken Kogyo Kabushiki Kaisha. Front and rear wheel steering device. 4,706,976, Cl. 280-91.000.

Kawamura, Ken: *See*—
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Kawanabe, Tomohiko: *See*—
Asakura, Masahiko; Kawanabe, Tomohiko; Kushida, Noritaka; and Hasebe, Hiroshi, 4,706,637, Cl. 123-589.000.

Kawasaki Jukogyo Kabushiki Kaisha: *See*—
Nakaoji, Kazuhiko; Kamao, Mitsugu; Itoh, Hayami; Tatsumi, Shuhei; and Takao, Shoichi, 4,706,891, Cl. 241-16.000.

Kawasaki Steel Corporation: *See*—
Mizota, Hisakazu; and Kojima, Shinji, 4,706,735, Cl. 164-504.000.

Kawasawa, Masuo: *See*—
Imai, Tatsuhiko; and Kawasawa, Masuo, 4,707,510, Cl. 524-281.000.

Kawase, Tadamasa: *See*—
Muraoka, Kenichi; Setoguchi, Yoichi; Kawase, Tadamasa; Kawata, Hiroitsu; Komatsu, Hisamoto; and Uchida, Makoto, 4,707,376, Cl. 426-658.000.

Kawata, Hiroitsu: *See*—
Muraoka, Kenichi; Setoguchi, Yoichi; Kawase, Tadamasa; Kawata, Hiroitsu; Komatsu, Hisamoto; and Uchida, Makoto, 4,707,376, Cl. 426-658.000.

Kawatsura, Yoshihiro: *See*—
Inuzuka, Tsuneki; Kawatsura, Yoshihiro; and Ishida, Masato, 4,707,111, Cl. 355-8.000.

Kawauchi, Satsuki: *See*—
Sakane, Isamu; and Kawauchi, Satsuki, 4,707,387, Cl. 427-393.500.

Kawazoe, Hideyo; Iino, Akira; and Orimo, Katsumi, to Furukawa Electric Co., Ltd., The. Method of fabricating porous glass rod and apparatus for fabricating the same. 4,707,173, Cl. 65-3.120.

Kaye, Paul S., to Lewisan Products, Inc. Drain-cleaning implement. 4,706,321, Cl. 15-104.3SN.

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Meyer, Horst; Franckowiak, Gerhard; Rosentreter, Ulrich; Gross, Rainer; Thomas, Gunter; Schramm, Matthias; Kayser, Michael; Seuter, Friedel; Perzborn, Elisabeth; and Bechem, Martin, 4,707,479, Cl. 514-222.000.

Kayukawa, Naoyuki: *See*—
Aoki, Yoshiaki; Kayukawa, Naoyuki; Yamazaki, Hatsuo; Ozawa, Yasutomo; and Kitagawa, Hiroki, 4,707,147, Cl. 374-161.000.

Kazui, Takahide. Card printer by means of a card feeding and type selecting printing method. 4,706,563, Cl. 101-93.430.

KDI Sylvan Pools, Inc.: *See*—
van den Broek, William A., 4,706,309, Cl. 4-508.000.

Kearney, Donald T.: *See*—
Vogel, Gerald J.; Kearney, Donald T.; Akpinar, Belkis K.; and Moorman, Charles T., 4,707,368, Cl. 426-386.000.

Kearney-National, Inc.: *See*—
Smith, Wayne A., 4,707,574, Cl. 200-48.0KB.

Kegly, Gyorgy: *See*—
Czvikovszky, Tibor; Kovacs, Gabor; Lakner, Endre; Mahr, Lajos; Somogyi, Agnes; Mikes, Sandor; Kegly, Gyorgy; Muzsai, Istvan; Palotas, Laszlo ; and Pfisztner, Nandor, 4,706,711, Cl. 138-103.000.

Kehr, Helmut; and Denzel, Horst, to Huels Aktiengesellschaft. Coating compositions for a polymer-modified roofing and waterproofing sheet. 4,707,413, Cl. 428-440.000.

Keith, John C.: *See*—
Clements, Brad; and Keith, John C., 4,707,571, Cl. 178-18.000.

Keller, Manfred, to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung. Proportional counter for detecting surface contaminations. 4,707,606, Cl. 250-374.000.

Kelly Industries, Inc.: *See*—
Baldino, Micheal; Voss, Robert L.; and Hladik, Larry L., 4,706,554, Cl. 98-121.200.

Kelly, Samuel T., to Robertshaw Controls Company. Fuel control valve construction, parts therefor and methods of making the same. 4,706,704, Cl. 137-489.500.

Kelly, William J.: *See*—
Astheimer, Robert W.; and Kelly, William J., 4,707,605, Cl. 250-347.000.

Kemner, Rudolf; Kalmijn, Hilco T.; and Van Heelsbergen, Teunis R., to U.S. Philips Corporation. MR-apparatus having a transmission-measuring coil for high frequencies. 4,707,662, Cl. 324-318.000.

Kendall, Kevin: *See*—
Lord, Leslie W.; Kendall, Kevin; Williams, David T.; and Bateson, John H., 4,707,351, Cl. 423-648.00R.

Kendrick, David A.: *See*—
Kolb, Michael; and Kendrick, David A., 4,707,498, Cl. 514-671.000.

Kenley, Rodney S.: *See*—
Fentress, Philip W.; Kenley, Rodney S.; and Schnell, William J., 4,707,335, Cl. 422-44.000.

Kennecott Corporation: *See*—
Kim, Jonathan J.; and Venkateswaran, Viswanathan, 4,707,583, Cl. 219-121.00P.

Kennedy, Peter; and Ware, John O., to United Kingdom Atomic Energy Authority. Reacting-bonded silicon carbide spheroids and process of making. 4,707,459, Cl. 501-90.000.

Kennon, Jerry M.; and Hayden, Leland E., to Westinghouse Electric Corp. Magnetic tamper detector. 4,707,679, Cl. 340-310.00A.

Kent Scientific and Industrial Projects Limited: *See*—
Jones, Julian D. C.; Jackson, David A.; and Leilabady, Pedram A., 4,706,502, Cl. 73-861.240.

Keogh, Michael J., to Union Carbide Corporation. Composition based on water-curable thermoplastic polymers and metal carboxylate silanol condensation catalysts. 4,707,520, Cl. 525-245.000.

Kerimis, Dimitrios: *See*—
Mues, Peter; Kerimis, Dimitrios; Muller, Hanns P.; and Buysch, Hans-Josef, 4,707,539, Cl. 528-371.000.

Kerivan, Leo J., to Precision Handling Devices, Inc. Perforated web feeding apparatus. 4,706,861, Cl. 226-74.000.

Kerjean, Joel: *See*—
Madiot, Andre ; and Kerjean, Joel, 4,706,366, Cl. 29-523.000.

Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung: *See*—
Iniotakis, Nicolaos; von der Decken, Claus-Benedict; Hecker, Rudolf; Frohling, Werner; and Schulten, Rudolf, 4,707,342, Cl. 423-248.000.
Keller, Manfred, 4,707,606, Cl. 250-374.000.
Steudle, Ernst; Zillikens, Josef; and Boling, Gerd, 4,706,495, Cl. 73-64.300.

Kershaw, Thomas R. Basketball return device. 4,706,954, Cl. 273-1.50A.

Kervagoret, Gilbert, to Bendix France. Hydraulic brake valve capable of operating as conventional master cylinder when brake pressure source fails. 4,706,460, Cl. 60-565.000.

Keskilohko, Altti K., to Lannen Tehtaat Oy. Planting device for plants. 4,706,582, Cl. 111-4.000.

Keusch, Preston; and Essmyer, John L., to Nepera Inc. Conductive adhesive medical electrode assemblies. 4,706,680, Cl. 128-640.000.

Keydar, Iafa, to Tel Aviv University; and Teva Pharmaceutical Industries, Limited. Immunoassay for breast cancer employing monoclonal antibodies. 4,707,438, Cl. 435-5.000.

Keys, Barbara J.: *See*—
King, Gail G.; Chen, Jiann-Yuh; and Keys, Barbara J., 4,707,374, Cl. 426-572.000.

Khosropour, Mostafa M., to Nelson Industries, Inc. Air dryer for air brake system. 4,707,166, Cl. 55-213.000.

Kidd, R. Christopher: *See*—
Mercer, John E.; Kidd, R. Christopher; and Merl, Milton, 4,706,824, Cl. 211-188.000.

Kidde Consumer Durables Corporation: *See*—
Compton, Wayne W., 4,706,331, Cl. 16-223.000.

Kieff, Elliott; Tanner, Jerome; Hummel, Mary; and Beisel, Christopher, to University of Chicago, The. Vaccine against Epstein-Barr Virus. 4,707,358, Cl. 424-89.000.

Kiessling, Michael: *See*—
Newiger, Winfried; Walch, Wolfgang; Rach, Harry; and Kiessling, Michael, 4,707,116, Cl. 355-30.000.

Kile, Jackson: *See*—
Farney, Michael K.; and Kile, Jackson, 4,706,834, Cl. 220-230.000.

Kim, Byoung Y., to Stanford University. Gated fiber optic rotation sensor with linearized scale factor. 4,707,136, Cl. 356-350.000.

Kim, Jonathan J.; and Venkateswaran, Viswanathan, to Kennecott Corporation. Plasma heated sintering furnace. 4,707,583, Cl. 219-121.00P.

Kimata, Masafumi; Yamawaki, Masao; and Yamakawa, Satoshi, to Mitsubishi Denki Kabushiki Kaisha. Solid-state image sensor. 4,707,744, Cl. 358-213.260.

Kimbara, Yoshihide, to Mitsubishi Denki Kabushiki Kaisha. Dual-polarization, dual-frequency cutting machine. 4,707,584, Cl. 219-121.0LG.

Kimberly-Clark Corporation: *See*—
Boggs, Lavada C., 4,707,398, Cl. 428-224.000.
Van Gompel, Paul T.; and Suprise, Jody D., 4,706,303, Cl. 2-49.00R.

Kimura, Naomi: *See*—
Nakamura, Toshio; Tamura, Tadashi; Kimura, Naomi; and Urata, Susumu, 4,706,555, Cl. 99-283.000.
Kimura, Takayoshi; Tsuyuguchi, Seiichi; and Mori, Yoshiaka, to Sumitomo Metal Mining Company Limited. Method of treating the slag from a copper converter. 4,707,185, Cl. 75-24.000.
Kimura, Tomoaki: *See*—
Kajiwara, Toshiyuki; Kimura, Tomoaki; and Nihei, Mitsuo, 4,706,871, Cl. 228-158.000.
Kimura, Yoshihiko: *See*—
Takahashi, Fumitaka; Kimura, Yoshihiko; Tsubata, Hideo; Ohji, Nobuaki; and Sashida, Kiyoshi, 4,707,057, Cl. 350-96.120.
Kin, Seki: *See*—
Tanaka, Hiroyuki; Kin, Seki; and Pu, Lyong S., 4,707,427, Cl. 430-59.000.
King, A. Douglas, Jr.; and Nassos-Stalder, Patricia S., to United States of America, Agriculture. Method for predicting the acceptability of coarsely ground beef. 4,707,444, Cl. 435-26.000.
King, Gail G.; Chen, Jiann-Yuh; and Keys, Barbara J., to Frito-Lay, Inc. Thermostable edible creme. 4,707,374, Cl. 426-572.000.
King, Steven M., to Barry Wright Corporation. Force and torque sensor. 4,706,505, Cl. 73-862.040.
King, William L., Jr.: *See*—
Paske, Richard, Jr.; Pallmer, Michael; and King, William L., Jr., 4,707,297, Cl. 252-301.160.
Kinoshita, Hiroshi: *See*—
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Kinoshita, Makoto: *See*—
Ebata, Yoshihiro; Hayami, Ryozo; Tamari, Nobuyuki; Toibana, Yasuo; and Kinoshita, Makoto, 4,707,416, Cl. 428-627.000.
Kirsh, Richard L.; and Ravin, Louis J., to Smithkline Beckman Corporation. Polyene antibiotic emulsion formulation. 4,707,470, Cl. 514-31.000.
Kirton, Alan J.: *See*—
Friehauf, William J.; Janssen, Donovan M.; Kirton, Alan J.; Nard, Michael E.; and Rose, Leroy, 4,707,753, Cl. 360-106.000.
Kishine, Toshiaki; Izawa, Hideo; and Ohba, Masaru, to Miyakoshi Printing Machinery Co., Ltd. Method of reconnecting drive shaft sections in phase in a web printing press having a print station and a perforating or like processing station. 4,706,566, Cl. 101-426.000.
Kistler, Francois, to Von Roll AG. Method for controlling and optimizing the operation of a perforated belt press for filtering slurry. 4,707,272, Cl. 210-709.000.
Kitagawa, Hiroki: *See*—
Aoki, Yoshiaki; Kayukawa, Naoyuki; Yamazaki, Hatsuo; Ozawa, Yasutomo; and Kitagawa, Hiroki, 4,707,147, Cl. 374-161.000.
Kitagishi, Tomoji; Sasaki, Akira; Hakoyama, Akiyoshi; Furukawa, Shigetaka; Suzaki, Masafumi; Kobayashi, Ryooichi; Mikami, Katsumasa; Takahashi, Yoshihito; Nagano, Yousuke; and Honma, Takeo, to Hitachi, Ltd. Thermal print head. 4,707,708, Cl. 346-76.0PH.
Kitajima, Akira: *See*—
Arai, Yoshio; Kitajima, Akira; and Akiba, Kouji, 4,706,760, Cl. 169-61.000.
Kitamura, Yosiharu: *See*—
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Kitano, Masayasu: *See*—
Ohkochi, Katsutoshi; Shinozaki, Mamoru; Ohshita, Toshiyuki; Kitano, Masayasu; and Kamata, Seizo, 4,706,753, Cl. 166-286.000.
Kitazawa, Yoichi: *See*—
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Kitchen, John A., to John A. Kitchen Ltd. Dehydrator. 4,706,390, Cl. 34-57.00R.
Kito, Koji: *See*—
Onozawa, Makoto; Osawa, Michitaka; Maekawa, Hitoshi; and Kito, Koji, 4,707,640, Cl. 315-408.000.
Kiuchi, Masayoshi: *See*—
Arakawa, Kazuhiko; Harada, Yoshihito; Kiuchi, Masayoshi; Tokura, Go; and Fujibayashi, Kazuo, 4,707,097, Cl. 354-217.000.
Klar, Erhard: *See*—
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Klemm, Kurt: *See*—
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Kliklok Corporation: *See*—
Cargile, John W., Jr., 4,706,879, Cl. 229-194.000.
Klimsch & Co. KG: *See*—
Newiger, Winfried; Walch, Wolfgang; Rach, Harry; and Kiessling, Michael, 4,707,116, Cl. 355-30.000.
Klomfass, Roy D., to Laursen, Jorn, a part interest. Self inflatable air deflector. 4,707,015, Cl. 296-1.00S.
Klose, Reinhard, to Salzgitter Industriebau GmbH. Method and system for the preparation of a highly concentrated mineral slurry having substantially constant identifying characteristics. 4,706,892, Cl. 241-16.000.
Kluegl, Wendelin: *See*—
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Knispel, Barry; and Wingert, Rudolf, to Arrow Fastener Company, Inc. Riveting attachment. 4,706,869, Cl. 227-156.000.
Knorr-Bremse AG: *See*—
Nadas, Julius, 4,706,786, Cl. 188-196.0BA.
Knorr, Fritz J., to Surface Science Laboratories, Inc. Fourier transform time of flight mass spectrometer. 4,707,602, Cl. 250-282.000.
Kobayashi, Hidemitsu: *See*—
Tomite, Tosio; Tani, Tatsuhiro; and Kobayashi, Hidemitsu, 4,707,630, Cl. 310-154.000.
Kobayashi, Masanori: *See*—
Mouri, Yasushi; Katayama, Kazuzo; Ichiryu, Taku; Mitsuhashi, Tsuneyoshi; and Kobayashi, Masanori, 4,706,969, Cl. 277-83.000.
Kobayashi, Masao: *See*—
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Kobayashi, Ryooichi: *See*—
Kitagishi, Tomoji; Sasaki, Akira; Hakoyama, Akiyoshi; Furukawa, Shigetaka; Suzaki, Masafumi; Kobayashi, Ryooichi; Mikami, Katsumasa; Takahashi, Yoshihito; Nagano, Yousuke; and Honma, Takeo, 4,707,708, Cl. 346-76.0PH.
Kobayashi, Satoshi: *See*—
Awane, Mitao; Hara, Seiji; and Kobayashi, Satoshi, 4,706,794, Cl. 194-217.000.
Kobayashi, Waichi; Usui, Koji; Hirosawa, Kozo; and Sadatani, Tetsuya, to Ube Industries, Ltd. Process for treating waste water containing phosphorus compounds and/or organic cod substances. 4,707,270, Cl. 210-683.000.
Kobayashi, Yoshinao: *See*—
Shinyagaito, Tatsuya; Kuramoto, Terumasa; Machida, Toyotaka; Saito, Kikuji; Shichijo, Shunichi; Yamagishi, Tooru; Ishii, Kazuyoshi; Kobayashi, Yoshinao; and Hirata, Atsumi, 4,707,733, Cl. 358-342.000.
Koboshi, Shigeharu; and Higuchi, Moeko, to Konishiroku Photo Industry Co., Ltd. Color image forming method comprising processing with a bleach-fixing solution. 4,707,434, Cl. 430-393.000.
Kobrehel, Michael D., to General Motors Corporation. Vehicle cable window regulator and slider guide assembly. 4,706,412, Cl. 49-352.000.
Kobs, Robert P.: *See*—
Callens, E. Eugene, Jr.; Crowson, Leslie L., Jr.; Kobs, Robert P.; Tull, Herbert G., III; and Tahtouh, Joseph F., 4,706,360, Cl. 29-407.000.
Koch, Christian; and Erdlen, Erwin, to EVK Energietechnik Verfahrenstechnik Umwelttechnik, Firma. Catalyst for the burning and conversion of gases and higher hydrocarbons, and apparatus for the reduction of nitric oxides and afterburning of exhaust gas by means of such catalyst. 4,707,341, Cl. 422-171.000.
Koch, Mark B.: *See*—
Goorsky, Mark S.; Koch, Mark B.; and Murray, Richard C., Jr., 4,706,677, Cl. 128-634.000.
Koch, Otto: *See*—
Seiter, Wolfgang; and Koch, Otto, 4,707,290, Cl. 252-140.000.
Kocher, Robert C., to Raytheon Company. Fiber optic beam delivery system for high-power laser. 4,707,073, Cl. 350-96.230.
Kochs Adler AG: *See*—
Vogt, Siegfried; and Schulze, Wolfram, 4,706,586, Cl. 112-121.290.
Kocmond, Warren C., Jr.: *See*—
Pasinski, Ralph R.; Ayers, Sammy L., Jr.; and Kocmond, Warren C., Jr., 4,707,855, Cl. 379-376.000.
Koehn, Hilde R.: *See*—
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Koehn, Peter W.: *See*—
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Koguro, Yasuyuki: *See*—
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Kohls, Mitchell L.; Smith, Loren G.; and Zahringer, H. David, to Jockey International, Inc. Merchandise display and dispensing device. 4,706,821, Cl. 211-593.000.
Koito Seisakusho Co., Ltd.: *See*—
Minobe, Shinichi; and Ueda, Tatsuo, 4,707,017, Cl. 296-78.100.
Koizumi, Junji; Sasaki, Kouji; and Naito, Junichiro, to Toyoda Gosei Co., Ltd. Polyamide resin composition. 4,707,528, Cl. 525-432.000.
Kojima, Shinji: *See*—
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Kojima, Yasunobu: *See*—
Kawahigashi, Nobuo; Hashida, Shigesou; and Kojima, Yasunobu, 4,707,314, Cl. 264-127.000.
Kolb, Michael; and Kendrick, David A., to Merrell Dow Pharmaceuticals Inc. Fluorinated diaminoalkyne derivatives. 4,707,498, Cl. 514-671.000.
Koleske, Joseph V., to Union Carbide Corporation. Low viscosity adducts of a poly(active hydrogen) organic compound and polyepoxide. 4,707,535, Cl. 528-110.000.
Kolubus GmbH & Co. KG: *See*—
Gerhard, Tolasch, 4,707,334, Cl. 422-28.000.
Komatsu, Hisamoto: *See*—
Muraoka, Kenichi; Setoguchi, Yoichi; Kawase, Tadamasa; Kawata, Hiroitsu; Komatsu, Hisamoto; and Uchida, Makoto, 4,707,376, Cl. 426-658.000.
Komatsu, Shinichi, to Atsugi Motor Parts Company Limited. Rack and pinion power steering apparatus. 4,706,513, Cl. 74-422.000.
Komatsu Zoki, Ltd.: *See*—
Hyoki, Takuzan; Uchida, Atsushi; and Yamamoto, Yuichi, 4,706,776, Cl. 180-334.000.
Komine, Shigeo: *See*—
Kato, Mikihiko; Okuzawa, Yasutoshi; Komine, Shigeo; and Morita, Kazuhiko, 4,707,392, Cl. 428-65.000.
Komori, Katsufumi: *See*—
Kanno, Masashi; Komori, Katsufumi; Tatekawa, Masaichirou; Miwa, Kiyohito; and Takaoka, Iwane, 4,707,109, Cl. 355-7.000.

Konan Electric Co., Ltd.: *See*—
Mizutani, Masashi, 4,707,168, Cl. 55-274.000.

Kondo, Hiroshi: *See*—
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Kondo, Isao; and Koguro, Yasuyuki, to Marui Industry Co., Ltd. Synthetic resin vehicle wheel cover. 4,707,035, Cl. 301-37.00P.

Kondou, Toshiyuki: *See*—
Ohue, Kazuto; Kondou, Toshiyuki; Takeuchi, Hisaharu; and Ikeda, Yuzo, 4,707,269, Cl. 210-651.000.

Konishiroku Photo Industry Co., Ltd.: *See*—
Inaba, Yoshihiro; Koshizuka, Kunihiro; Maehashi, Tatsuichi; and Abe, Takao, 4,707,406, Cl. 428-336.000.
Koboshi, Shigeharu; and Higuchi, Moeko, 4,707,434, Cl. 430-393.000.
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Konnemann, Alfred, to Grote & Hartmann GmbH & Co. KG. Extra locking element for round plugs. 4,707,050, Cl. 439-747.000.

Konstantinov, Vladimir B.: *See*—
Gurevich, Simkha B.; Konstantinov, Vladimir B.; Chernykh, Dmitry F.; Levushkin, Vladislav M.; Pisarevskaya, Svetlana A.; Cheberyak, Mikhail S.; and Latyshev, Alexandr I., 4,707,053, Cl. 350-3.600.

Koors, Mark A.: *See*—
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Kopp, Clinton: *See*—
Shah, Dilip H.; and Kopp, Clinton, 4,707,268, Cl. 210-650.000.

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Kottas, Robert P. Tool for removing residues. 4,706,416, Cl. 51-170.00T.

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Ayata, Naoki; Saito, Seiji; Suzuki, Hidetoshi; Ozawa, Kunitaka; and Koumura, Noboru, 4,707,713, Cl. 346-140.00R.

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Thomas, Michael; Neumann, Peter; Wegerle, Dieter; and Krallmann, Reinhold, 4,707,161, Cl. 8-442.000.

Krammer, Johann: *See*—
Pieh, Stefan; and Krammer, Johann, 4,707,508, Cl. 524-106.000.

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Gliha, Edward R.; and Krantz, Leonard A., Jr., 4,707,048, Cl. 439-620.000.

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Coldren, Bruce E.; and Krause, Kenneth W., 4,707,647, Cl. 318-568.000.

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Kreutmair, Josef, to Man Technologie GmbH. Method and apparatus for the automatic control of a sorption heat transfer plant. 4,706,464, Cl. 62-101.000.

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Kroecher, Harro, to Hombak Maschinenfabrik GmbH & Co. KG. Centering and clamping apparatus for elongate round bodies of various diameter. 4,706,948, Cl. 269-34.000.

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Kruse, Lawrence I.: *See*—
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Schafer, Walter; Muller, Hanns P.; Kuchenmeister, Rolf; and Sickert, Armin, 4,707,386, Cl. 427-386.000.

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Sturm, Budd H.; and Kuczkowski, Joseph A., 4,707,300, Cl. 252-404.000.

Kudo, Sinji, to Stanley Electric Co., Ltd. Molded electronic circuit device. 4,707,763, Cl. 361-386.000.

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Memminger, Gustav; Roser, Erich; and Kuhn, Falk, 4,706,476, Cl. 66-132.00R.

Kuhn, Roscoe E.: *See*—
Moro, Dominik J.; Reisinger, Robert R.; Larson, James M.; and Kuhn, Roscoe E., 4,706,570, Cl. 105-163.200.

Kuhnigk, Theo: *See*—
Stromberg, Wilfried; and Kuhnigk, Theo, 4,706,451, Cl. 59-85.000.

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Zimmer, Ernst, 4,706,510, Cl. 74-89.210.

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Hashimoto, Shintaro; Masuzawa, Sigeaki; Kunita, Hisao; Inoue, Tomohiro; and Nishimura, Kosuke, 4,707,794, Cl. 364-513.500.

Kuno, Akira: *See*—
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Gessel, James M.; Jasper, Edward P.; and Kunz, Gary L., 4,706,448, Cl. 56-400.000.

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Rockenfeller, Gottfried; Rockenfeller, Wolfgang; and Kunze, Friedheim, 4,706,345, Cl. 24-135.00L.

Kuo, Youti: *See*—
Shinbrot, Troy; and Kuo, Youti, 4,707,113, Cl. 355-14.0SH.

Kuramoto, Terumasa: *See*—
Shinyagaito, Tatsuya; Kuramoto, Terumasa; Machida, Toyotaka; Saito, Kikuji; Shichijo, Shunichi; Yamagishi, Tooru; Ishii, Kazuyoshi; Kobayashi, Yoshinao; and Hirata, Atsumi, 4,707,733, Cl. 358-342.000.

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Mori, Takashi; Fukuda, Kenichi; and Kurauchi, Yasuhiro, 4,707,234, Cl. 204-182.300.

Kurita, Toshiyuki: *See*—
Matono, Takaaki; Murata, Toshinori; Kurita, Toshiyuki; and Nakagawa, Isao, 4,707,732, Cl. 358-31.000.

Kuroda, Shigeaki: *See*—
Oguni, Kensaku; Ishibane, Kyuhei; Kuroda, Shigeaki; Yasuda, Hiromu; Sano, Takashi; and Etou, Hironori, 4,706,469, Cl. 62-222.000.

Kusayanagi, Sampo: *See*—
Kaimai, Takashi; and Kusayanagi, Sampo, 4,707,280, Cl. 252-49.600.

Kushida, Noritaka: *See—*
Asakura, Masahiko; Kawanabe, Tomohiko; Kushida, Noritaka; and Hasebe, Hiroshi, 4,706,637, Cl. 123-589.000.

Kuznicki, William J.: *See—*
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Kan, Kwok-Ning S., 4,706,486, Cl. 72-302.000.

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Dempsey, Russell M.; Fragala, Anthony R.; LaConti, Anthony B.; and Enos, John F., 4,707,229, Cl. 204-129.000.

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Don Michael, T. Anthony; and Lambert, Edward H., 4,706,688, Cl. 128-785.000.

Lambert, Joseph. Dental floss device. 4,706,694, Cl. 132-92.00R.

Lancelot, Jean-Charles: *See—*
Arrang, Jean-Michel; Garbarg, Monique; Lancelot, Jean-Charles; Lecomte, Jeanne-Marie; Robba, Max-Fernand; and Schwartz, Jean-Charles, 4,707,487, Cl. 514-326.000.

Lane, Martin: *See—*
Croset, Michel R.; Lane, Martin; Winchester, Roy E.; and Worsley, David R., 4,707,598, Cl. 250-223.00R.

Lanese, Pasquale J.: *See—*
Furmanek, Robert A.; Mukherjee, Jyoti P.; and Lanese, Pasquale J., 4,706,352, Cl. 29-149.50R.

Lang, David J.: *See—*
Chun, Kil Whan; Gilbert, Allan H.; Lang, David J.; and Santos, Edward, 4,707,160, Cl. 8-101.000.

Lange, Catherine: *See—*
Clement, Jean-Luc; Lemaire, Michele; Lange, Catherine; Lhommet, Gerard; Celerier, Jean-Pierre; Basselier, Jean-Jacques; and Cassier, Pierre, 4,707,489, Cl. 514-408.000.

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Langenwalter, Michael: *See—*
Haberland, Detlef; Langenwalter, Michael; Panzer, Klaus; Rosen, Hans G.; Spaeter, Lothar; Spaeth, Werner; Seibert, Bernd; and Haltenorth, Helmut, 4,707,067, Cl. 350-96.200.

LaNieve, H. Leslie, III; Drzal, Robert S.; and Ehrlich, Benjamin S., to Celanese Corporation. Oxymethylene polymer molding compositions having enhanced impact resistance and article molded therefrom. 4,707,525, Cl. 525-399.000.

Lannen Tehtaat Oy: *See—*
Keskilohko, Altti K., 4,706,582, Cl. 111-4.000.

LaPerna, Joseph D.: *See—*
Sorensen, Jay R.; and LaPerna, Joseph D., 4,706,684, Cl. 128-677.000.

Lapp, Hans-Gunter: *See—*
Schonfeld, Joachim; Lapp, Hans-Gunter; and Greiner, Gabriele, 4,706,898, Cl. 241-73.000.

Larkin, Francis C.: *See—*
Sherman, William, III; Larkin, Francis C.; and Horvath, Stephen J., 4,707,599, Cl. 250-223.00R.

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Larson, David E.: *See—*
Anderson, Wayne H.; Larson, David E.; and Reinhart, Mark R., 4,707,750, Cl. 360-60.000.

Larson, James M.: *See—*
Moro, Dominik J.; Reisinger, Robert R.; Larson, James M.; and Kuhn, Roscoe E., 4,706,570, Cl. 105-163.200.

Laser Dynamics, Inc.: *See—*
Clements, Ken, 4,707,814, Cl. 369-13.000.

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Lee, Wai-Hon, 4,707,137, Cl. 356-353.000.

Latourelle, Guy; and Gauthier, Jean-Claude. Conversion unit for all terrain vehicles. 4,706,769, Cl. 180-9.210.

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Gurevich, Simkha B.; Konstantinov, Vladimir B.; Chernykh, Dmitry F.; Levushkin, Vladislav M.; Pisarevskaya, Svetlana A.; Cheberyak, Mikhail S.; and Latyshev, Alexandr I., 4,707,053, Cl. 350-3.600.

Lau, Kei-Fung: *See—*
Stokes, Robert B.; Yen, Kuo-Hsiung; Lau, Kei-Fung; Kagiwada, Reynold S.; and Delaney, Michael J., 4,707,631, Cl. 310-313.00A.

Lauderbach, Leo, to Stabilus GmbH. Gas springs with different active lengths to provide plural stable stopping positions. 4,706,333, Cl. 16-289.000.

Laursen, Jorn: *See—*
Klomfass, Roy D., 4,707,015, Cl. 296-1.00S.

Lautenschlager, Karl, Jr., to Karl Lautenschlager GmbH & Co. KG. Cabinet hinge. 4,706,332, Cl. 16-241.000.

Lavoie, Gaston. Engine. 4,706,452, Cl. 60-39.350.

Lavorel, Gerard, to Ateliers de Decoupage, Emboutissage et Mecanique de la Vallee de l'Arve ADEMVA, Societe Anonyme. Fast-action multiple tapping machine. 4,706,369, Cl. 29-560.000.

Lawall, Robert. Form for producing arcuate bores in poured concrete slabs. 4,706,927, Cl. 249-177.000.

Lawless, Daniel F.: *See—*
Betterton, Joseph T.; Dykoski, Alan W.; Glover, Alfred H.; Lawless, Daniel F.; McKee, William D.; and Watson, Troy T., 4,706,707, Cl. 137-565.000.

Lawther, Joel S., to Eastman Kodak Company. Film initialization reassuring mechanism. 4,707,096, Cl. 354-215.000.

Layh, Hans-Dieter. Position signaller which compensates for backlash in its gear transmission. 4,707,601, Cl. 250-231.0SE.

Leal, Luis T. Computer security system. 4,707,804, Cl. 340-825.320.

LeBlon, Hubert. Coaxial multi-function insertable cartridge valve. 4,706,547, Cl. 91-420.000.

Leclere, Patrick: *See—*
Baudequin, Francois; and Leclere, Patrick, 4,707,350, Cl. 423-637.000.

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Arrang, Jean-Michel; Garbarg, Monique; Lancelot, Jean-Charles; Lecomte, Jeanne-Marie; Robba, Max-Fernand; and Schwartz, Jean-Charles, 4,707,487, Cl. 514-326.000.

Lee, Arthur K.: *See—*
Sanchez-Caldera, Luis E.; Suh, Nam P.; Chun, Jung-Hoon; Lee, Arthur K.; and Blackall, Frederick S., IV, 4,706,730, Cl. 164-135.000.

Lee Company, The: *See—*
Lee, Leighton, II, 4,706,705, Cl. 137-514.500.

Lee, Do I.: *See—*
Beer, James J.; and Lee, Do I., 4,707,221, Cl. 162-158.000.

Lee, Ernie J.; and Thornton, William L., to Four E Inc. Drill bit assembly. 4,706,765, Cl. 175-334.000.

Lee, Hsiao-Peng S.; Rawlinson, Stephen J.; and Si, Stephen S. C., to Amdahl Corporation. Ancillary execution unit for a pipelined data processing system. 4,707,783, Cl. 364-200.000.

Lee, Kyong; H.; and Maschhoff, Robert H., to Gulton Industries, Inc. Directional coupling transformer for bi-directional full duplex data bus. 4,707,673, Cl. 333-112.000.

Lee, Leighton, II, to Lee Company, The. Check valve. 4,706,705, Cl. 137-514.500.

Lee, Richard: *See—*
Chung, Yo C., 4,706,937, Cl. 254-93.00H.

Lee, Stephen J., to Thor Ceramics Limited. Stopper for use in molten metal handling. 4,706,944, Cl. 266-272.000.

Lee, Wai-Hon, to Laser Magnetic Storage International Company. Device and method for testing the wave front quality of optical components. 4,707,137, Cl. 356-353.000.

Lefebvre, Fredrick L. Immersion heater device. 4,707,590, Cl. 219-523.000.

Legge, Ronald N., to Motorola Inc. Controlled chemical reduction of surface film. 4,706,870, Cl. 228-123.000.

Legros, Jean-Pierre: *See—*
Cariteau, Bernard; Legros, Jean-Pierre; Charrieras, Andre ; and Feuvrier, Michel, 4,706,423, Cl. 52-169.700.

Lehman, E. Dale: *See—*
Friedman, Arthur; Lehman, E. Dale; McAleer, William J.; Schaefer, Ted F.; Scolnick, Edward M.; and Wampler, D. Eugene, 4,707,542, Cl. 530-371.000.

Lehnert, Werner, to Saarbergwerke Aktiengesellschaft. Process to reheat flue gases cleaned by the wet process. 4,706,580, Cl. 110-345.000.

Leider, Michael J. Ball quiver. 4,706,860, Cl. 224-247.000.

Leigh, Arthur G.; and Martin, John R., to Lever Brothers Company. Device for conditioning fabrics in the tumble-dryer. 4,706,802, Cl. 206-0.500.

Leighton, John C.; and Iovine, Carmine P., to National Starch and Chemical Corporation. Alpha-aminomethylene phosphonate betaines and polymers prepared therewith. 4,707,306, Cl. 260-501.120.

Leilabady, Pedram A.: *See—*
Jones, Julian D. C.; Jackson, David A.; and Leilabady, Pedram A., 4,706,502, Cl. 73-861.240.

Leinfelder, Klaus: *See—*
Cullmann, Wolfgang; and Leinfelder, Klaus, 4,706,916, Cl. 248-168.000.

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Leivenzon, Simon; and Leivenzon, Zvi, 4,706,727, Cl. 160-188.000.

Lemaire, Michele: *See—*
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Lemforder Metallwaren A.G.: *See—*
Hahle, Hermann, 4,707,149, Cl. 384-294.000.

Leonard, Warren: *See—*
Nelson, David; Biddison, William; Rubin, Laurence; Greene, Warner; Leonard, Warren; and Yarchoan, Robert, 4,707,443, Cl. 435-7.000.

Leoni, Gianni: *See—*
Andersen, Erik; and Leoni, Gianni, 4,706,670, Cl. 128-344.000.

Lepp, Cyrus A.; Mussatto, James J.; and Ziegenmeyer, James M., to Ciba Corning Diagnostics Corp. System for identification of cells by electrophoresis. 4,707,237, Cl. 204-182.800.

Lesnak, Stefan: *See*—
Blaskovits, Pavol; Lesnak, Stefan; Martisik, Alois; Zajac, Jan; Slavkovsky, Jan; Turiansky, Ladislav; and Levius, Rudolf, 4,707,581, Cl. 219-73.110.

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Leu, Willey, to Ferag AG. Apparatus for collating differentiated printed products. 4,706,951, Cl. 270-55.000.

Leutwein, Manfred: *See*—
Blattner, Dietmar; Dieterle, Hermann; Leutwein, Manfred; and Simon, Horst, 4,706,370, Cl. 29-564.200.

Lever Brothers Company: *See*—
Chun, Kil Whan; Gilbert, Allan H.; Lang, David J.; and Santos, Edward, 4,707,160, Cl. 8-101.000.
Irlam, Geoffrey; and Smith, Ian J., 4,707,288, Cl. 252-121.000.
Leigh, Arthur G.; and Martin, John R., 4,706,802, Cl. 206-0.500.
Thom, David; Swarthoff, Ton; and Maat, Jan, 4,707,291, Cl. 252-174.120.

Leverette, David S.: *See*—
Spamer, William S.; and Leverette, David S., 4,706,820, Cl. 211-59.200.

Levi, Anthony F. J.: *See*—
Hensel, John C.; Levi, Anthony F. J.; and Tung, Raymond T., 4,707,197, Cl. 437-189.000.

Levine, Jeffrey A.: *See*—
Covey, Douglas F.; Levine, Jeffrey A.; and Ferrendelli, James A., 4,707,491, Cl. 514-445.000.

Levinson, Harold N. Diagnostic screening procedure for identifying dysmetric dyslexia. 4,706,686, Cl. 128-745.000.

Levius, Rudolf: *See*—
Blaskovits, Pavol; Lesnak, Stefan; Martisik, Alois; Zajac, Jan; Slavkovsky, Jan; Turiansky, Ladislav; and Levius, Rudolf, 4,707,581, Cl. 219-73.110.

Levushkin, Vladislav M.: *See*—
Gurevich, Simkha B.; Konstantinov, Vladimir B.; Chernykh, Dmitry F.; Levushkin, Vladislav M.; Pisarevskaya, Svetlana A.; Cheberyak, Mikhail S.; and Latyshev, Alexandr L., 4,707,053, Cl. 350-3.600.

Lewis, Edward T.: *See*—
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Lewisan Products, Inc.: *See*—
Kaye, Paul S., 4,706,321, Cl. 15-104.3SN.

Lexen, Gerald. Valve arrangement for use with a hydraulic accumulator. 4,706,930, Cl. 251-26.000.

Lhommet, Gerard: *See*—
Clement, Jean-Luc; Lemaire, Michele; Lange, Catherine; Lhommet, Gerard; Celerier, Jean-Pierre; Basselier, Jean-Jacques; and Cassier, Pierre, 4,707,489, Cl. 514-408.000.

Li, Ernest L., to Owens-Illinois Closure Inc. Liquid containing and dispensing package. 4,706,829, Cl. 215-354.000.

Liao, Zeng-kun: *See*—
Wang, Chun S.; Liao, Zeng-kun; and Steele, Dennis L., 4,707,558, Cl. 568-23.000.

Liba Maschinenfabrik GmbH: *See*—
Wunner, Roland, 4,706,475, Cl. 66-84.00A.

Libman Broom Company: *See*—
Batchelor, Douglas R., 4,706,323, Cl. 15-119.00A.

Lind, Bjorn, to SKF Nova AB. Seal with pressure fluid feed. 4,706,966, Cl. 277-27.000.

Linde Aktiengesellschaft: *See*—
Bauer, Heinz, 4,707,171, Cl. 62-30.000.

Lindemann Maschinenfabrik GmbH: *See*—
Schonfeld, Joachim; Lapp, Hans-Gunter; and Greiner, Gabriele, 4,706,898, Cl. 241-73.000.

Lindow, James T.; Bennett, Simon D.; and Smith, Ian R., to SiScan Systems, Inc. Method and apparatus for measuring surface profiles. 4,707,610, Cl. 250-560.000.

Lindsay, Brendan J. Hanger and clip therefor. 4,706,347, Cl. 24-517.000.

Lindsey, Carole B., to Eastman Kodak Company. Recovery of microorganism having ice nucleating activity. 4,706,463, Cl. 62-64.000.

Linstromberg, William J.: *See*—
Janke, Donald E.; and Linstromberg, William J., 4,707,684, Cl. 340-530.000.

Lion Corporation: *See*—
Nakaoji, Kazuhiko; Kamao, Mitsugu; Itoh, Hayami; Tatsumi, Shuhei; and Takao, Shoichi, 4,706,891, Cl. 241-16.000.

Lion Laboratories Limited: *See*—
Jones, Thomas P., 4,707,336, Cl. 422-84.000.

Liquidometer Corporation: *See*—
Strand, Theodore L., 4,707,046, Cl. 439-314.000.

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Geigert, John; Liu, Te-Ning E.; and N'timkulu, Thabiso, 4,707,446, Cl. 435-132.000.

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Peppel, George W.; and Sullivan, Paul E., 4,706,998, Cl. 285-167.000.

Loeber, Frederick W.; Cummins, Nolan W.; Modglin, Rodger L.; and Greene, George O., to Unit Rig & Equipment Company. Rim for heavy, off-road vehicles. 4,706,723, Cl. 152-410.000.

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Riebel, Ulrich, 4,706,509, Cl. 73-865.500.

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Long, Stuart G.; and Maciocia, Michael J., to General Dynamics, Pomona Division. Electrostatic-free package. 4,707,414, Cl. 428-511.000.

Look, Gunter: *See*—
Gerstner, Richard; Look, Gunter; Seybold, Werner; and Stener, Werner, 4,707,034, Cl. 301-6.00V.

Lopata, Alexander D.: *See*—
Giammarco, Nicholas J.; Gimpelson, Alexander; Kaplita, George A.; Lopata, Alexander D.; Scaduto, Anthony F.; and Shepard, Joseph F., 4,707,218, Cl. 156-643.000.

Lord, Leslie W.; Kendall, Kevin; Williams, David T.; and Bateson, John H., to Imperial Chemical Industries PLC. Catalyst and catalytic process. 4,707,351, Cl. 423-648.00R.

Lorenzi, Silvana: *See*—
della Valle, Francesco; Romeo, Aurelio; and Lorenzi, Silvana, 4,707,469, Cl. 514-26.000.

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Sato, Yoshinori; Tsuchiya, Yukio; and Fujimoto, Keiji, 4,707,363, Cl. 426-3.000.

Lovqvist, Bo, to Strumpfabriken Vinetta Aktiebolag. Plant guard. 4,706,411, Cl. 47-30.000.

Lowitz, David A., to Philip Morris Incorporated. Impurity detector measuring parallel polarized scattered electromagnetic radiation. 4,707,652, Cl. 324-58.50B.

Lowrie, Harman S.: *See*—
Baran, John S.; and Lowrie, Harman S., 4,707,499, Cl. 514-471.000.

Lubotta, Mark S.; and Scullion, Martin, to FCA International Ltd. Self-mailer envelope. 4,706,878, Cl. 229-73.000.

Lubrizol Corporation, The: *See*—
Lange, Richard M., 4,707,301, Cl. 252-46.600.

Lucas Industries public limited company: *See*—
Draper, Francis R.; Francis, John H.; and Ogburn, Alan P., 4,706,635, Cl. 123-506.000.
Farr, Glyn P. R., 4,707,036, Cl. 303-6.00C.
Harvey, David M.; and Moody, Charistopher J., 4,706,887, Cl. 239-453.000.
Rath, Heinrich-Bernhard; and Holz, Dietrich, 4,706,783, Cl. 188-79.50B.

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Rasshofer, Werner; Ganster, Otto; Luckas, Brund; and Rottmaier, Ludwig, 4,707,502, Cl. 521-159.000.

Lummus Crest, Inc.: *See*—
Baldasarri, Mario; Adams, William R.; and Caspers, John, 4,707,245, Cl. 208-57.000.

Lumonics Inc.: *See*—
Hunter, John H., 4,707,711, Cl. 346-108.000.

Lund, Gary K.: *See*—
Esneault, Calvin P.; and Lund, Gary K., 4,707,521, Cl. 525-250.000.

Lundblad, Bengt: *See*—
Bolmstedt, Ulf; and Lundblad, Bengt, 4,706,741, Cl. 165-115.000.

Lundwall, Neal M.; and Herigstad, Donald, to United States of America, Navy. Chemiluminescent marking warhead. 4,706,568, Cl. 102-513.000.

Lutz, Phillip A.: *See*—
Jung, James E.; Koors, Mark A.; and Lutz, Phillip A., 4,706,811, Cl. 206-331.000.

Lux, Benno: *See*—
Schachner, Herbert; Tippmann, Heinz; Lux, Benno; Stjernberg, Klas G.; and Thelin, Anders G., 4,707,384, Cl. 427-249.000.

Lynn, Dale E.: *See*—
DiPiazza, Philip S.; Lynn, Dale E.; and Weber, Donald J., 4,707,689, Cl. 340-706.000.

Lyons, Thomas D.; and Jamieson, Peter B., to Minnesota Mining and Manufacturing Company. Industrial X-ray system. 4,707,435, Cl. 430-494.000.

M.A.C., Inc.: *See*—
Christianson, Paul O.; and McDonald, James M., 4,706,646, Cl. 126-117.000.

M.A.N.Roland Druckmaschinen AG: *See*—
Theilacker, Klaus, 4,706,862, Cl. 226-92.000.

M.D.C. Romani, Inc.: *See*—
Romani, R. Marlene, 4,706,326, Cl. 15-314.000.

Maat, Jan: *See*—
Thom, David; Swarthoff, Ton; and Maat, Jan, 4,707,291, Cl. 252-174.120.

Mabey, Bevil G.; and Mabey, David G., to Mabey & Johnson Limited. Lattice bridges. 4,706,436, Cl. 52-645.000.

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Mabey, Bevil G.; and Mabey, David G., 4,706,436, Cl. 52-645.000.

Mabey & Johnson Limited: *See*—
Mabey, Bevil G.; and Mabey, David G., 4,706,436, Cl. 52-645.000.
MacChesney, John B.: *See*—
Johnson, David W., Jr.; MacChesney, John B.; Rabinovich, Eliezer M.; and Vogel, Eva M., 4,707,174, Cl. 65-18.100.
MacDonnell, Alfred T.: *See*—
Mowatt, Harry C.; MacDonnell, Alfred T.; and Clark, George T., 4,706,406, Cl. 43-61.000.
Macey, Keith S.: *See*—
Ruetschle, Rudolph H.; and Macey, Keith S., 4,706,950, Cl. 270-54.000.
Machida, Toyotaka: *See*—
Shinyagaito, Tatsuya; Kuramoto, Terumasa; Machida, Toyotaka; Saito, Kikuji; Shichijo, Shunichi; Yamagishi, Tooru; Ishii, Kazuyoshi; Kobayashi, Yoshinao; and Hirata, Atsumi, 4,707,733, Cl. 358-342.000.
Macho Products, Inc.: *See*—
Cho, Soo S., 4,706,305, Cl. 2-425.000.
Maciocia, Michael J.: *See*—
Long, Stuart G.; and Maciocia, Michael J., 4,707,414, Cl. 428-511.000.
Mackereth, Thomas C.: *See*—
Field, Anthony J.; Heerah, Atma; and Mackereth, Thomas C., 4,707,742, Cl. 358-183.000.
Macku, Ales: *See*—
Neufuss, Karel; Macku, Ales; Forejt, Antonin; and Kasik, Pavel, 4,707,379, Cl. 427-34.000.
MacMillan Bloedel Limited: *See*—
Churchland, Mark T.; and Schilling, Walter W., 4,706,799, Cl. 198-457.000.
Madiot, Andre ; and Kerjean, Joel, to Etablissements Lemer & Cie. Method of manufacturing a double-wall container including a neutron-absorbing screen for transporting and storing radio-active material. 4,706,366, Cl. 29-523.000.
Maeda, Hiroaki: *See*—
Inagaki, Toshiyuki; and Maeda, Hiroaki, 4,706,549, Cl. 91-448.000.
Maeda, Hiroshi: *See*—
Celmer, Walter D.; Cullen, Walter P.; Maeda, Hiroshi; Ruddock, John C.; and Tone, Junsuke, 4,707,493, Cl. 514-460.000.
Maeda, Yoshinobu: *See*—
Seno, Makito; Misawa, Yoshihiko; Maeda, Yoshinobu; and Fukumoto, Kengi, 4,706,379, Cl. 29-740.000.
Maehashi, Tatsuichi: *See*—
Inaba, Yoshihiro; Koshizuka, Kunihiro; Maehashi, Tatsuichi; and Abe, Takao, 4,707,406, Cl. 428-336.000.
Maekawa, Hitoshi: *See*—
Onozawa, Makoto; Osawa, Michitaka; Maekawa, Hitoshi; and Kito, Koji, 4,707,640, Cl. 315-408.000.
Magic American Chemical Corporation: *See*—
Zeilinger, Alan, 4,706,427, Cl. 52-288.000.
Magliano, Silvio, to American Standard Inc. Irreversible free wheeling clutch. 4,706,791, Cl. 192-8.00R.
Magna International Inc.: *See*—
Harding, Dukecal J., 4,707,030, Cl. 297-341.000.
Magnes, Herbert. Liquid level control system. 4,706,310, Cl. 4-508.000.
Maguire, James. Furnace register humidifier. 4,706,552, Cl. 98-30.000.
Mahefkey, Edward T., to United States of America, Air Force. Ventable survivable heat pipe vapor chamber spacecraft radiator. 4,706,740, Cl. 165-104.140.
Mahr, Lajos: *See*—
Czvikovszky, Tibor; Kovacs, Gabor; Lakner, Endre; Mahr, Lajos; Somogyi, Agnes; Mikes, Sandor; Kegly, Gyorgy; Muzsai, Istvan; Palotas, Laszlo ; and Pfisztner, Nandor, 4,706,711, Cl. 138-103.000.
Maidique, Modesto A.: *See*—
Brokaw, Adrian P.; and Maidique, Modesto A., 4,707,682, Cl. 340-347.0AD.
Major, Eugene O., to United States of America, Health and Human Services. Immortal line of human fetal glial cells. 4,707,448, Cl. 435-240.250.
Makibayashi, Katsunori; Murase, Kenji; and Kunihiro, Motoo, to Toyo Tire & Rubber Co., Ltd.; and Toyota Jidosha Kabushiki Kaisha. Vibration preventing device. 4,706,947, Cl. 267-140.100.
Makiej, Paul A. Particle catcher for inhalation devices. 4,706,663, Cl. 128-200.180.
Makino, Yoshiyuki: *See*—
Sadamitsu, Kazuo; and Makino, Yoshiyuki, 4,706,713, Cl. 138-137.000.
Mako Marine, Inc.: *See*—
Petrilli, Peter J., 4,706,810, Cl. 206-320.000.
Mallinckrodt, Inc.: *See*—
Bugaj, Joseph E.; and Grogg, Terry W., 4,707,353, Cl. 424-1.100.
Malojer, Robert: *See*—
Blauhut, Wilfried; Hoschek, Gunter; and Malojer, Robert, 4,706,531, Cl. 83-346.000.
Malone, Gary R.: *See*—
Hammerle, Frederick A.; Allen, Philip M.; Geddes, Richard; and Malone, Gary R., 4,706,868, Cl. 227-149.000.
Malpass, Dennis B.; Fannin, Loyd W.; Crapo, Clark C.; and Triplett, Kelly B., to Texas Alkyls, Inc. Organomagnesium solutions of low viscosity. 4,707,462, Cl. 502-153.000.
Man, Daniel. Implantable homing device. 4,706,689, Cl. 128-903.000.
Man Technologie GmbH: *See*—
Kreutmair, Josef, 4,706,464, Cl. 62-101.000.
Manchester R & D Partnership: *See*—
Fergason, James L., 4,707,080, Cl. 350-334.000.
Mandeville, W. Harry: *See*—
Coffen, David L.; Holland, George W.; Mandeville, W. Harry; Rosen, Perry; and Wong, Frederick, 4,707,555, Cl. 549-311.000.
Mandrell, Robert: *See*—
Zollinger, Wendell D.; Boslego, John; Moran, Ellen; Brandt, Brenda; Collins, Hugh; Mandrell, Robert; Altieri, Patricia; and Berman, Sanford, 4,707,543, Cl. 530-402.000.
Manley, Inc.: *See*—
Feng, Chung L.; and Yang, Ching-Wen, 4,706,557, Cl. 99-355.000.
Mannesmann AG: *See*—
Haualaib, Wolfgang, 4,707,157, Cl. 400-616.000.
Spoeler, Johannes-Gerhard; and Janssen, Heinz-Uwe, 4,706,782, Cl. 187-20.000.
Mannesmann Rexroth GmbH: *See*—
Gossl, Dietmar; Muncke, Ludwig; and Wittich, Kurt, 4,706,545, Cl. 91-32.000.
Manning, Steven F.: *See*—
Horvath, Zoltan L.; Kavanagh, Gary A.; Manning, Steven F.; Pyszel, Ronald J.; Rogers, Lloyd W.; and Schlaps, Edgar H., 4,707,027, Cl. 297-284.000.
Manser, Gerald E.; and Fletcher, Richard W., to Morton Thiokol, Inc. Nitramine oxetanes and polyethers formed therefrom. 4,707,540, Cl. 528-417.000.
Manville Corporation: *See*—
Wilson, Jerry F., 4,706,876, Cl. 229-52.00B.
Marathon Oil Company: *See*—
Plummer, Mark A., 4,707,264, Cl. 210-634.000.
Smith, Ronald E., 4,706,754, Cl. 166-295.000.
Marcus, Bonita K.: *See*—
Lok, Brent M. T.; Marcus, Bonita K.; and Flanigen, Edith M., 4,707,345, Cl. 423-326.000.
Marczak, Stanislaw: *See*—
Achmatowicz, Barbara; Daniewski, Andrzej R.; Marczak, Stanislaw; Pankowski, Jacek; and Wicha, Jerzy, 4,707,554, Cl. 549-214.000.
Mardian, Kris A.: *See*—
Kozozian, Gagik; and Mardian, Kris A., 4,706,768, Cl. 177-138.000.
Maremont Corporation: *See*—
Johnson, Daniel C.; and Brummel, David J., 4,706,358, Cl. 29-235.000.
Margolis, Joel, to Gradiant Pty Limited. Device for extraction of electrophoretic fractions. 4,707,233, Cl. 204-182.300.
Mark Controls Corporation: *See*—
Brown, George W., 4,706,934, Cl. 251-87.000.
Markezich, Ronald L., to Occidental Chemical Corporation. Polyesterether elastomer compositions having improved flame retardant properties. 4,707,506, Cl. 524-89.000.
Markhart, Gary T.: *See*—
Valenzky, David; and Markhart, Gary T., 4,707,139, Cl. 366-77.000.
Marlboro Marketing, Inc.: *See*—
Mercer, John E.; Kidd, R. Christopher; and Merl, Milton, 4,706,824, Cl. 211-188.000.
Marley, John; and Marley, Kurt. Voice command recognition system having compact significant feature data. 4,707,857, Cl. 381-43.000.
Marley, Kurt: *See*—
Marley, John; and Marley, Kurt, 4,707,857, Cl. 381-43.000.
Marmon Group, Inc., The: *See*—
Foster, Matthew R., 4,706,608, Cl. 119-35.000.
Marom, Emanuel, to Hughes Aircraft Company. Real time image subtraction with a single liquid crystal light valve. 4,707,077, Cl. 350-162.120.
Marom, Emanuel: *See*—
Nudd, Graham R.; and Marom, Emanuel, 4,707,859, Cl. 382-28.000.
Mars G. B. Limited: *See*—
Buckley, Keith; Prest, Colin T.; and Wilkinson, Paul, 4,707,375, Cl. 426-578.000.
Marshall, Colin K.: *See*—
Howard, Richard K.; and Marshall, Colin K., 4,707,054, Cl. 350-3.650.
Marshall, R. H.: *See*—
Jewell, J. N.; Korte, K. R.; Marshall, R. H.; and Zipperle, Kevin A., 4,706,691, Cl. 131-300.000.
Martin, Henry; and Fricker, Urs, to Ciba-Geigy Corporation. Phenoxine-ketal ethers, compositions containing them and the use thereof. 4,707,182, Cl. 71-94.000.
Martin, John; White, Ronald W.; and White, Johnnie L., Jr. Multi-color engraving system. 4,706,565, Cl. 101-151.000.
Martin, John R.: *See*—
Leigh, Arthur G.; and Martin, John R., 4,706,802, Cl. 206-0.500.
Martin, R. Craig, to JM Industries, Inc. Apparatus for mounting an advertising display unit for use with a public telephone. 4,706,399, Cl. 40-584.000.
Martin, Robert J., to Blue Bell, Inc. Binary coding system. 4,707,612, Cl. 250-568.000.
Martinez, David R., to Atlantic Richfield Company. Method of suppressing vibration seismic signal correlation noise. 4,707,812, Cl. 367-46.000.
Martinou, Robert; and Ruimi, Michel, to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation (SNECMA). Pickling process for heat-resistant alloy articles. 4,707,191, Cl. 134-3.000.
Martisik, Aloiz: *See*—
Blaskovits, Pavol; Lesnak, Stefan; Martisik, Aloiz; Zajac, Jan; Slavkovsky, Jan; Turiansky, Ladislav; and Levius, Rudolf, 4,707,581, Cl. 219-73.110.

Marui Industry Co., Ltd.: *See*—
Kondo, Isao; and Koguro, Yasuyuki, 4,707,035, Cl. 301-37.00P.

Marumo, Takachi: *See*—
Bandou, Masaaki; Sugita, Masao; and Marumo, Takachi, 4,706,487, Cl. 72-355.000.

Maruyama, Seiichiro; Hayashida, Hironori; Morita, Kazumasa; and Shiraishi, Yoshitaka, to Mitsubishi Chemical Industries Limited. Polyester resin composition. 4,707,512, Cl. 524-504.000.

Marxer, Herbert, to Lange International S.A. Ski boot fastener. 4,706,393, Cl. 36-117.000.

Marzan, Jose M. Circuit test fixture. 4,707,656, Cl. 324-158.00F.

Masaharu, Tsuboi, to Honda Giken Kogyo Kabushiki Kaisha. Motorcycle rear suspension subassembly. 4,706,774, Cl. 180-227.000.

Maschhoff, Robert H.: *See*—
Lee, Kyong; H.; and Maschhoff, Robert H., 4,707,673, Cl. 333-112.000.

Masciarelli, Camillo. Conveyor system with rollers and plungers. 4,706,793, Cl. 193-35.00A.

Mashiko, Harumitsu: *See*—
Ohshima, Kiyoshi; Suzuki, Shigeru; Mashiko, Harumitsu; and Ohdake, Eisyu, 4,707,126, Cl. 355-14.0SH.

Masler, William F., III: *See*—
Amjad, Zahid; and Masler, William F., III, 4,707,271, Cl. 210-701.000.

Mason, Robert L. Locking removable support surface and adapter. 4,706,574, Cl. 108-97.000.

Mason, Stanley I., Jr.; Wolfe, Allan P.; and Turner, Robert B., to Crisis Communication, Inc. Kit for making sets of transparent fingerprints using differential adhesion. 4,706,600, Cl. 118-31.500.

Massachusetts Institute of Technology: *See*—
Jones, Alun G.; Davison, Alan; and Abrams, Michael J., 4,707,544, Cl. 534-14.000.

Masuzawa, Sigeaki: *See*—
Hashimoto, Shintaro; Masuzawa, Sigeaki; Kunita, Hisao; Inoue, Tomohiro; and Nishimura, Kosuke, 4,707,794, Cl. 364-513.500.

Matern, Klaus: *See*—
Hartmann, Franz; and Matern, Klaus, 4,706,336, Cl. 17-55.000.

Mathew, Chempolil T.; and Ulmer, Harry E., to Allied Corporation. Preparation of alcoholic hydroxylamine solution from hydroxylammonium sulfate. 4,707,294, Cl. 252-182.000.

Matin, Barry D.: *See*—
Trepus, George E., Jr.; Matin, Barry D.; and Rider, Preston L., 4,707,206, Cl. 156-187.000.

Matono, Takaaki; Murata, Toshinori; Kurita, Toshiyuki; and Nakagawa, Isao, to Hitachi, Ltd. Separating circuit of luminance and chrominance signals for TV receiver selecting between three three line comb filters. 4,707,732, Cl. 358-31.000.

Matsuda, Hideki: *See*—
Hayakawa, Masatoshi; Aso, Koichi; Ochiai, Yoshitaka; Matsuda, Hideki; Hayashi, Kazuhiko; Ishikawa, Wataru; and Iwasaki, You, 4,707,417, Cl. 428-630.000.

Matsuda, Toshiro, to Nissan Motor Company, Limited. Fail-safe system in a power regulation circuit for an automotive electronic circuit. 4,707,758, Cl. 361-18.000.

Matsumoto, Nobuyoshi: *See*—
Tsuda, Kenji; Matsumoto, Nobuyoshi; and Tsukagawa, Masahide, 4,707,188, Cl. 106-93.000.

Matsumoto, Takahiro: *See*—
Saitou, Yosio; Kataoka, Takeshi; Takechi, Moriaki; and Matsumoto, Takahiro, 4,707,676, Cl. 335-216.000.

Matsuno, Yoshio; Miyamoto, Toshio; and Morita, Hideyo, to Nissan Motor Co. Ltd. Glass fiber reinforced propylene-ethylene copolymer base resin composition. 4,707,505, Cl. 523-203.000.

Matsushita Electric Industrial Co., Ltd.: *See*—
Kanno, Masashi; Komori, Katsufumi; Tatekawa, Masaichirou; Miwa, Kiyohito; and Takaoka, Iwane, 4,707,109, Cl. 355-7.000.
Mekata, Tsuyoshi; Saka, Hiroshi; and Tanaka, Toshihide, 4,707,669, Cl. 331-99.000.
Nakamura, Toshio; Tamura, Tadashi; Kimura, Naomi; and Urata, Susumu, 4,706,555, Cl. 99-283.000.
Ogawa, Kazufumi, 4,707,433, Cl. 430-289.000.
Seno, Makito; Misawa, Yoshihiko; Maeda, Yoshinobu; and Fukumoto, Kengi, 4,706,379, Cl. 29-740.000.

Matsushita Electric Works, Ltd.: *See*—
Motoyama, Masanori; Nishikawa, Toyotaka; and Nakagawa, Masashi, 4,707,675, Cl. 335-130.000.

Matsushita, Toshihiko: *See*—
Morishita, Sadao; Matsushita, Toshihiko; and Sekine, Mikiya, 4,707,404, Cl. 428-335.000.

Mattes, Gunther; and Ortmanns, Gunter, to Saint Gobain Vitrage. Process for coating glass with a film of tin oxide. 4,707,383, Cl. 427-168.000.

Matthaei, Dieter: *See*—
Frahm, Jens; Haase, Axel; Matthaei, Dieter; Haenicke, Wolfgang; and Merboldt, Klaus-Dietmar, 4,707,658, Cl. 324-309.000.

Matthews, Larry S.; and Goldstein, Steven A., to University of Michigan, Regents of the. Flexible connecting shaft for intramedullary reamer. 4,706,659, Cl. 128-92.0VD.

Matthews, Norman G.: *See*—
Nugent, John L.; Rush, George C.; and Matthews, Norman G., 4,707,665, Cl. 328-14.000.

Matthiessen, Hans; and Winkler, Jorg, to Dragerwerk Aktiengesellschaft. Self-contained portable photoelectric gas measuring and warning apparatus. 4,707,614, Cl. 250-576.000.

Matzkanin, Randy L., to Alternative Energy Resources. Solar collector assembly and kit. 4,706,650, Cl. 126-450.000.

Mausner, Leonard F.: *See*—
Richards, Powell; Mausner, Leonard F.; and Prach, Thomas F., 4,707,322, Cl. 376-194.000.

Mauthe, Peter, to Hilti Aktiengesellschaft. Destructible cartridge for anchoring rods or the like. 4,706,806, Cl. 206-219.000.

Max-Planck-Gesellschaft zur Foerderung der Wissenschaften e.V.: *See*—
Frahm, Jens; Haase, Axel; Matthaei, Dieter; Haenicke, Wolfgang; and Merboldt, Klaus-Dietmar, 4,707,658, Cl. 324-309.000.

Maxwell Laboratories, Inc.: *See*—
Chu, Edmond Y.; and Valencia, Vance I., 4,707,619, Cl. 307-106.000.

May, David R.: *See*—
Brooks, Steve M.; and May, David R., 4,707,589, Cl. 219-464.000.

Mayer, Robert T., to U.S. Philips Corporation. Telephone with digit cancellation. 4,707,854, Cl. 379-356.000.

Mayers, Joseph B.: *See*—
Wilson, John F.; Gjertsen, Robert K.; and Mayers, Joseph B., 4,707,326, Cl. 376-261.000.

Mayo, Steven A.: *See*—
Swan, Jye P.; Weinerman, Lee S.; and Mayo, Steven A., 4,706,478, Cl. 70-208.000.

Mazda Motor Corporation: *See*—
Nishikawa, Toshihide; Hanada, Kenichirou; Nishimura, Yukinobu; and Shimomura, Setsuhiro, 4,706,634, Cl. 123-492.000.
Okimoto, Haruo; and Tashima, Seiji, 4,706,621, Cl. 123-216.000.
Watanabe, Kenichi; and Taniguchi, Haruyuki, 4,706,945, Cl. 267-186.000.

McAleer, William J.: *See*—
Friedman, Arthur; Lehman, E. Dale; McAleer, William J.; Schaefer, Ted F.; Scolnick, Edward M.; and Wampler, D. Eugene, 4,707,542, Cl. 530-371.000.

McBride, Donald G.; and Rickert, Robert G., to International Business Machines Corporation. Method and apparatus for controlling the organic contamination level in an electroless plating bath. 4,707,378, Cl. 427-8.000.

McBride, Donald G.: *See*—
Capwell, Robert J.; Kaschak, Ronald A.; McBride, Donald G.; Rickert, Robert G.; and Seraphim, Donald P., 4,707,377, Cl. 427-8.000.

McCarten, Barry M.: *See*—
Fehn, John H.; Arakawa, Mitsuaki; and McCarten, Barry M., 4,707,664, Cl. 324-322.000.

McColl, J. D.: *See*—
Garlen, David; Koehn, Hilde R.; Koehn, Peter W.; and McColl, J. D., 4,707,354, Cl. 424-47.000.

McColl, John W.; Mott, Philip J.; and Salle, Ralph D., to Borg-Warner Automotive, Inc. Starting clutch assembly for a continuously variable transmission. 4,706,789, Cl. 192-0.075.

McConway & Torley Corporation: *See*—
Elliott, William O.; and Glover, Mary A., 4,706,826, Cl. 213-61.000.

McCoy, Donald M.; and McCoy, James M. Apparatus for reinforcing a concrete block wall. 4,706,428, Cl. 52-293.000.

McCoy, James M.: *See*—
McCoy, Donald M.; and McCoy, James M., 4,706,428, Cl. 52-293.000.

McCulloch, Dean E.: *See*—
Lockhart, Bruce D.; McCulloch, Dean E.; Tierney, Gordon L.; and Wehner, Cyrus A., 4,706,790, Cl. 192-3.300.

McCutchan, Thomas F.; and Dame, John B., to United States of America, Health and Human Services. Intact gene and method of excising and cloning same. 4,707,445, Cl. 435-91.000.

McCutchan, Thomas F.: *See*—
Dame, John B.; Williams, Jackie L.; McCutchan, Thomas F.; and Schneider, Imogene, 4,707,357, Cl. 424-88.000.

McDonald, Dean, to Durakon Industries, Inc. Tailgate cap and cover assembly. 4,707,016, Cl. 296-39.00R.

McDonald, James M.: *See*—
Christianson, Paul O.; and McDonald, James M., 4,706,646, Cl. 126-117.000.

McDonald, Ronald; and Hengeveld, John A., to American Coin Currency Equipment Corporation. Relating to microprocessor controlled cash counting apparatus. 4,707,843, Cl. 377-8.000.

McKay, Donald. Apparatus for mounting screens. 4,706,728, Cl. 160-339.000.

McKee, William D.: *See*—
Betterton, Joseph T.; Dykoski, Alan W.; Glover, Alfred H.; Lawless, Daniel F.; McKee, William D.; and Watson, Troy T., 4,706,707, Cl. 137-565.000.

McKernon, David A.; and North, Lawrence A., to Delco Products Overseas Corporation. Electrically operable actuator. 4,706,512, Cl. 74-405.000.

McKiel, Frank A., Jr., to Rockwell International Corporation. Real-time tail length monitor for wire bonding flame-off apparatus. 4,707,579, Cl. 219-56.220.

McKim, Richard L., Jr. Handle attachment for cardboard boxes. 4,707,011, Cl. 294-16.000.

McLachlan, Richard D.; and Rothman, Leslie D., to Dow Chemical Company, The. Fiber optic probe. 4,707,134, Cl. 356-342.000.

McMahan, David R.: *See*—
Van Duyn, Paul D.; McMahan, David R.; Geddie, John D.; and Nagengast, William E., Jr., 4,707,771, Cl. 362-66.000.

McMahon, Donald H., to Polaroid Corporation. Optical communication system employing frequency reference. 4,707,061, Cl. 350-96.160.

McMullen, Arnold I. Insecticide composition for controlling insects which have an aquatic breeding site. 4,707,359, Cl. 424-92.000.

McMurtry, David R., to Renishaw Electrical Limited. Machine tool. 4,706,371, Cl. 29-568.000.

McNutt, Robert L.: *See*—
Dawson, Ian J.; and McNutt, Robert L., 4,706,772, Cl. 180-167.000.

McSweeney, Daniel R., to General Foods Corporation. Method for increasing the rate of solubility of fumaric acid and compositions. 4,707,366, Cl. 426-96.000.

McVeigh, James B., Jr.; Reise, Terrence F.; and Taylor, Alwyn H., to Duracell Inc. Spirally wound electrochemical cells. 4,707,421, Cl. 429-94.000.

Mead Corporation, The: *See*—
Baugus, Gary; and Oliff, James R., 4,706,814, Cl. 206-427.000.
Halsell, H. Lee, 4,706,809, Cl. 206-319.000.
Spamer, William S.; and Leverette, David S., 4,706,820, Cl. 211-59.200.

Meadows, Robert D.: *See*—
Krein, Philip T.; Meadows, Robert D.; Murdock, Bruce; and Teichmer, Daniel G., 4,707,845, Cl. 178-19.000.

Meadox Surgimed A/S: *See*—
Andersen, Erik; and Leoni, Gianni, 4,706,670, Cl. 128-344.000.

Measurex Corporation: *See*—
Hu, Hung-Tzaw, 4,707,779, Cl. 364-148.000.

Meatto, Franklin D., to TriStar Sports Inc. Alpine ski with selective reinforcement. 4,706,985, Cl. 280-610.000.

Mechoulam, Raphael; and Feigenbaum, Jeffery J. Analgetic and antiemetic compositions. 4,707,559, Cl. 568-644.000.

Media Systems Technology, Inc.: *See*—
Anderson, Wayne H.; Larson, David E.; and Reinhart, Mark R., 4,707,750, Cl. 360-60.000.

Medicarb AB: *See*—
Larm, Olle; and Seljelid, Rolf, 4,707,471, Cl. 514-54.000.

Mega X Protection: *See*—
Cariteau, Bernard; Legros, Jean-Pierre; Charrieras, Andre ; and Feuvrier, Michel, 4,706,423, Cl. 52-169.700.

Meier, Lynn A.; and Saele, Arvid H., to Deere & Company. Enclosure panel for tractor. 4,707,021, Cl. 296-196.000.

Meininger, Fritz; and Schlafer, Ludwig, to Hoechst Aktiengesellschaft. Process for the preparation of lithium salts of anionic dyes by reacting the calcium salts with lithium sulfate or lithium hydrogen sulfate. 4,707,545, Cl. 534-588.000.

Meistrell, Robert F. Head restraint. 4,707,031, Cl. 297-393.000.

Meistrell, William R., to Dive N'Surf, Inc. Liquid pack and retention device therefor. 4,706,673, Cl. 128-402.000.

Meistrick, Zdenek S.; and Quenneville, Raymond N., to Jacobs Manufacturing Company, The. Compression release retarder with valve motion modifier. 4,706,624, Cl. 123-321.000.

Meistrick, Zdenek S.; and Price, Robert B., to Jacobs Manufacturing Company, The. Engine retarder with reset auto-lash mechanism. 4,706,625, Cl. 123-321.000.

Meixner, Heinrich: *See*—
Giebel, Wolfgang; and Meixner, Heinrich, 4,707,200, Cl. 156-48.000.

Mekata, Tsuyoshi; Saka, Hiroshi; and Tanaka, Toshihide, to Matsushita Electric Industrial Co., Ltd. Dielectric resonator microwave oscillator having enhanced negative resistance. 4,707,669, Cl. 331-99.000.

Mellard, George K. Marbles counter weighted repeating mouse trap. 4,706,408, Cl. 43-69.000.

Melles Griot, Irvine Company: *See*—
Inman, Scott; and Enright, Mitchell K., 4,706,788, Cl. 188-378.000.

Melton, Melvin M. Animal trap. 4,706,407, Cl. 43-69.000.

Memminger, Gustav; Roser, Erich; and Kuhn, Falk, to Memminger, Gustav. Yarn supply apparatus for textile machines especially circular knitting machines. 4,706,476, Cl. 66-132.00R.

Menault, Jacques: *See*—
Achard, Georges; Anouilh, Gilbert; and Menault, Jacques, 4,707,319, Cl. 264-168.000.

Menne, Rudolf: *See*—
Cloke, Martin; Horton, Michael; Menne, Rudolf; and Stwiorok, Andreas, 4,706,622, Cl. 123-306.000.

Merboldt, Klaus-Dietmar: *See*—
Frahm, Jens; Haase, Axel; Matthaei, Dieter; Haenicke, Wolfgang; and Merboldt, Klaus-Dietmar, 4,707,658, Cl. 324-309.000.

Mercer, John E.; Kidd, R. Christopher; and Merl, Milton, to Marlboro Marketing, Inc. Variable sized free standing promotional display. 4,706,824, Cl. 211-188.000.

Merck & Co., Inc.: *See*—
Christensen, Burton G.; and Ratcliffe, Ronald W., 4,707,547, Cl. 540-310.000.
Friedman, Arthur; Lehman, E. Dale; McAleer, William J.; Schaefer, Ted F.; Scolnick, Edward M.; and Wampler, D. Eugene, 4,707,542, Cl. 530-371.000.

Merck Patent Gesellschaft mit beschrankter Haftung: *See*—
Pohl, Ludwig; Scheuble, Bernhard; Wachtler, Andreas; Hittich, Reinhard; and Fuss, Peter, 4,707,295, Cl. 252-299.620.

Merl, Milton: *See*—
Mercer, John E.; Kidd, R. Christopher; and Merl, Milton, 4,706,824, Cl. 211-188.000.

Merrell Dow Pharmaceuticals Inc.: *See*—
Kolb, Michael; and Kendrick, David A., 4,707,498, Cl. 514-671.000.

Merrell, Gene A., to Betz Laboratories, Inc. Method of reducing fireside deposition from the combustion of solid fuels. 4,706,579, Cl. 110-343.000.

Merriman, Michael M.: *See*—
Brink, David L.; Merriman, Michael M.; and Mixon, David A., 4,706,903, Cl. 241-188.00R.

Mertinkat, Willi: *See*—
Warnke, Heinrich; Kaup, Friedel; Bersch, Bernhard; Mertinkat, Willi; and Tenhaven, Ulrich, 4,707,385, Cl. 427-374.100.

Metallgesellschaft Aktiengesellschaft: *See*—
Ruhle, Manfred; and Wincierz, Peter, 4,706,894, Cl. 241-30.000.

Meyer, Gundolf; and Verpoort, Clemeens, to BBC Brown, Boveri & Company, Ltd. Process for the hot-forming of at least one sheet made of a material that is difficult to work. 4,706,361, Cl. 29-423.000.

Meyer, Horst; Franckowiak, Gerhard; Rosentreter, Ulrich; Gross, Rainer; Thomas, Gunter; Schramm, Matthias; Kayser, Michael; Seuter, Friedel; Perzborn, Elisabeth; and Bechem, Martin, to Bayer Aktiengesellschaft. Circulation active dihydropyridine-3-carboxamides. 4,707,479, Cl. 514-222.000.

Meyer, Vernis H.; and Schlueter, Francis E. Cylinder-mounted rotary valve. 4,706,710, Cl. 137-625.470.

Meyering, Mark T.: *See*—
Barnes, Robert G., Jr.; and Meyering, Mark T., 4,707,265, Cl. 210-638.000.

Meyers, Brad E. Invisible light beam projector and night vision system. 4,707,595, Cl. 250-504.00R.

Michaels, Leonard H.; and Miller, Robert A., to Molex Incorporated. Environmentally sealed electrical connector. 4,707,047, Cl. 439-271.000.

Michalski, David E., to Arachnid, Inc. Dart board with target plates structured as discrete grids. 4,706,962, Cl. 273-347.000.

Michard, Jean A.; and De Saint-Martin, Lucien, to Institut de Recherches de la Siderurgie Francaise (Irsid). Method of operating a blast furnace with plasma heating. 4,707,183, Cl. 75-10.220.

Michelson, Manfred G. Film cleaner. 4,706,325, Cl. 15-308.000.

MicroComputer Accessories Inc.: *See*—
Clark, James B., 4,707,156, Cl. 400-613.200.

Miele & Cie. GmbH & Co.: *See*—
Warnke, Heinrich; Kaup, Friedel; Bersch, Bernhard; Mertinkat, Willi; and Tenhaven, Ulrich, 4,707,385, Cl. 427-374.100.

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Mikalor, S.A.: *See*—
Verges, Jaime M., 4,706,346, Cl. 24-274.00R.

Mikami, Akiyoshi: *See*—
Ogura, Takashi; Tanaka, Koichi; Taniguchi, Koji; Yoshida, Masaru; and Mikami, Akiyoshi, 4,707,419, Cl. 428-690.000.

Mikami, Katsumasa: *See*—
Kitagishi, Tomoji; Sasaki, Akira; Hakoyama, Akiyoshi; Furukawa, Shigetaka; Suzaki, Masafumi; Kobayashi, Ryooichi; Mikami, Katsumasa; Takahashi, Yoshihito; Nagano, Yousuke; and Honma, Takeo, 4,707,708, Cl. 346-76.0PH.

Mikami, Mitsugu; Yukimoto, Kougi; and Ishii, Jun, to Kabushiki Kaisha Nipponcoinco. Coin discriminator. 4,706,795, Cl. 194-317.000.

Mikes, Sandor: *See*—
Czvikovszky, Tibor; Kovacs, Gabor; Lakner, Endre; Mahr, Lajos; Somogyi, Agnes; Mikes, Sandor; Kegly, Gyorgy; Muzsai, Istvan; Palotas, Laszlo ; and Pfisztner, Nandor, 4,706,711, Cl. 138-103.000.

Mile High Equipment Company: *See*—
Yingst, Thomas E.; and Weis, Fredrick A., 4,706,466, Cl. 62-138.000.

Miles Laboratories, Inc.: *See*—
Barach, Jeffrey T.; and Talbott, Larry L., 4,707,364, Cl. 426-36.000.

Millar, Malcolm H.: *See*—
Hutton, Denis A.; and Millar, Malcolm H., 4,707,307, Cl. 260-502.00R.

Miller, Craig: *See*—
Soberalski, Edward D.; and Miller, Craig, 4,706,919, Cl. 248-281.100.

Miller, Dennis H.; and Mutka, Jerry R., to Sunkist Growers, Inc. Solid essential oil flavor composition. 4,707,367, Cl. 426-96.000.

Miller, James W.; and O'Neill, John J., to Pfizer Inc. Drilling fluid additive containing high pyruvate xanthan. 4,707,281, Cl. 252-8.514.

Miller, John W.; Mittelmark, Melvin F.; and Schmidt, Roger N., to Honeywell Inc. Auxiliary starting for electric motors. 4,707,644, Cl. 318-136.000.

Miller, Mahlon A. Trailer front stone guard. 4,706,991, Cl. 280-770.000.

Miller, Robert A.: *See*—
Michaels, Leonard H.; and Miller, Robert A., 4,707,047, Cl. 439-271.000.

Milligan, John D. Staged guide plate and vessel assembly. 4,707,340, Cl. 422-140.000.

Milo, Joseph V., to Universal Valve Co., Inc. Containment manhole having spillage sealing means. 4,706,718, Cl. 141-86.000.

Milton, John S.: *See*—
Page, Robert G.; and Milton, John S., 4,706,706, Cl. 137-527.800.

Mims, Ken, to Uddo Mims International, Inc. Method and apparatus for removing granular material from an aeration basin. 4,707,277, Cl. 210-805.000.

Mimura, Takanobu: *See*—
Toida, Akikazu; Iwata, Satoshi; Takahashi, Fumio; and Mimura, Takanobu, 4,707,703, Cl. 346-1.100.

Minami, Akira, to Fujitsu Limited. Focus servomechanism control system of optical disc system having offset setting means. 4,707,648, Cl. 318-640.000.

Mindell, Marvin I., to D. O. Industries, Inc. Transparency transport system for overhead projector. 4,707,092, Cl. 353-109.000.

Mine Safety Appliances Company: *See*—
Schneider, Alan A.; Stewart, David A.; Jolson, Joseph D.; Auel, RaeAnn M.; and Price, John F., 4,707,242, Cl. 204-412.000.

Minkoff, Lawrence A.; and Danby, Gordon T., to Fonar Corporation. Nuclear magnetic resonance apparatus using low energy magnetic elements. 4,707,663, Cl. 324-319.000.

Minnesota Mining and Manufacturing Co.: *See—*
Dieken, Alan P.; and Dufresne, Joel R., 4,706,674, Cl. 128-419.00R.
Ground, Damon R., 4,706,914, Cl. 248-74.300.
Lyons, Thomas D.; and Jamieson, Peter B., 4,707,435, Cl. 430-494.000.
Rambosek, George M., 4,707,399, Cl. 428-225.000.
Schultz, William J., 4,707,534, Cl. 528-97.000.
Stypulkowski, Paul H.; and van den Honert, Christopher, 4,706,682, Cl. 128-642.000.

Minobe, Shinichi; and Ueda, Tatsuo, to Koito Seisakusho Co., Ltd. Adjustable height windshield apparatus for motorcycles. 4,707,017, Cl. 296-78.100.

Minolta Camera Kabushiki Kaisha: *See—*
Inoue, Manabu; Fujino, Akihiko; Hirano, Masayasu; Nakai, Masaaki; and Yoshida, Fumio, 4,707,104, Cl. 354-412.000.

Mir, Jose M., to Eastman Kodak Company. Linear light valve arrays having transversely driven electro-optic gates and method of making such arrays. 4,707,081, Cl. 350-388.000.

Mirram Drive Inc.: *See—*
Sivalingam, Ramalingam, 4,706,520, Cl. 74-781.00R.

Misawa, Yoshihiko: *See—*
Seno, Makito; Misawa, Yoshihiko; Maeda, Yoshinobu; and Fukumoto, Kengi, 4,706,379, Cl. 29-740.000.

Misumi, Teruo, to Canon Kabushiki Kaisha. Plasma CVD apparatus. 4,707,210, Cl. 156-345.000.

Mitchell, Bruce R.; and Vogel, Roger F., to Chevron Research Company. Vanadium passivation in a hydrocarbon catalytic cracking process. 4,707,461, Cl. 502-64.000.

Mitel Corporation: *See—*
Cogan, Frederick T., 4,707,764, Cl. 361-390.000.

Mitsubishi Chemical Industries Limited: *See—*
Maruyama, Seiichiro; Hayashida, Hironori; Morita, Kazumasa; and Shiraishi, Yoshitaka, 4,707,512, Cl. 524-504.000.
Niwa, Toshio; Himeno, Kiyoshi; and Hihara, Toshio, 4,707,546, Cl. 534-635.000.
Yoneda, Norihiko; Fukuhara, Tsuyoshi; and Nozawa, Seiichi, 4,707,536, Cl. 528-198.000.

Mitsubishi Denki Kabushiki Kaisha: *See—*
Fujikawa, Katsuhiro, 4,706,588, Cl. 112-239.000.
Hara, Zenichirou; and Iwatsuji, Ichirou, 4,707,638, Cl. 315-169.300.
Higuchi, Keizo, 4,707,690, Cl. 340-750.000.
Hirabayashi, Kazuo; and Yamamoto, Makoto, 4,707,717, Cl. 357-23.110.
Ito, Eizo, 4,707,725, Cl. 357-72.000.
Kajita, Takeyoshi, 4,707,774, Cl. 363-37.000.
Kimata, Masafumi; Yamawaki, Masao; and Yamakawa, Satoshi, 4,707,744, Cl. 358-213.260.
Kimbara, Yoshihide, 4,707,584, Cl. 219-121.0LG.
Naitou, Yasuo, 4,707,792, Cl. 364-431.070.
Nishikawa, Toshihide; Hanada, Kenichirou; Nishimura, Yukinobu; and Shimomura, Setsuhiro, 4,706,634, Cl. 123-492.000.
Okamoto, Tatsuo; Shimizu, Masahiro; and Tsukamoto, Katsuhiro, 4,707,723, Cl. 357-67.000.
Saitou, Yosio; Kataoka, Takeshi; Takechi, Moriaki; and Matsumoto, Takahiro, 4,707,676, Cl. 335-216.000.
Tominaga, Yoshiharu, 4,706,479, Cl. 72-8.000.
Wataya, Seiji, 4,706,631, Cl. 123-488.000.

Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
Hirakawa, Tadashi; Yano, Tadashi; and Hamada, Kenichi, 4,706,863, Cl. 226-95.000.

Mitsubishi Kenki Kabushiki Kaisha: *See—*
Adachi, Mitsunori; and Tomita, Satoru, 4,707,737, Cl. 358-133.000.

Mitsubishi Mining & Cement Co., Ltd.: *See—*
Okazaki, Kiyoshi, 4,707,311, Cl. 264-43.000.

Mitsubishi Paper Mills, Ltd.: *See—*
Ikeda, Haruhiko; and Hiraishi, Shigetoshi, 4,707,463, Cl. 503-209.000.
Morishita, Sadao; Matsushita, Toshihiko; and Sekine, Mikiya, 4,707,404, Cl. 428-335.000.

Mitsubishi Rayon Co., Ltd.: *See—*
Ishii, Kazuhiro; Uno, Tetsuya; Kato, Masaki; and Kobayashi, Masao, 4,707,460, Cl. 502-26.000.

Mitsubishi Yukogyo: *See—*
Mouri, Yasushi; Katayama, Kazuzo; Ichiryu, Taku; Mitsuhashi, Tsuneyoshi; and Kobayashi, Masanori, 4,706,969, Cl. 277-83.000.

Mitsuhashi, Tsuneyoshi: *See—*
Mouri, Yasushi; Katayama, Kazuzo; Ichiryu, Taku; Mitsuhashi, Tsuneyoshi; and Kobayashi, Masanori, 4,706,969, Cl. 277-83.000.

Mitsui Engineering and Shipbuilding Company Limited: *See—*
Nakaoji, Kazuhiko; Kamao, Mitsugu; Itoh, Hayami; Tatsumi, Shuhei; and Takao, Shoichi, 4,706,891, Cl. 241-16.000.

Mitsui Toatsu Chemicals, Incorporated: *See—*
Sasagawa, Katsuyoshi; Nishihara, Kunio; Ozawa, Hiroshi; and Imai, Masao, 4,707,425, Cl. 430-21.000.

Mittelmark, Melvin F.: *See—*
Miller, John W.; Mittelmark, Melvin F.; and Schmidt, Roger N., 4,707,644, Cl. 318-136.000.

Miura, Kunihiko, to Kabushiki Kaisha Toshiba. Printing apparatus. 4,707,715, Cl. 346-160.000.

Miwa, Kiyohito: *See—*
Kanno, Masashi; Komori, Katsufumi; Tatekawa, Masaichirou; Miwa, Kiyohito; and Takaoka, Iwane, 4,707,109, Cl. 355-7.000.

Mixalloy Corporation: *See—*
Sanchez-Caldera, Luis E.; Suh, Nam P.; Chun, Jung-Hoon; Lee, Arthur K.; and Blackall, Frederick S., IV, 4,706,730, Cl. 164-135.000.

Mixon, David A.: *See—*
Brink, David L.; Merriman, Michael M.; and Mixon, David A., 4,706,903, Cl. 241-188.00R.

Miyadera, Yasuo: *See—*
Fujioka, Atsushi; Miyadera, Yasuo; and Fukuda, Tomio, 4,707,316, Cl. 264-135.000.

Miyagi, Kunihiko, to Kabushiki Kaisha Machida Seisakusho. Light quantity adjuster for endoscope apparatus. 4,706,657, Cl. 128-6.000.

Miyakoshi Printing Machinery Co., Ltd.: *See—*
Kishine, Toshiaki; Izawa, Hideo; and Ohba, Masaru, 4,706,566, Cl. 101-426.000.

Miyamoto, Hiroshi, to ORC Manufacturing Co., Ltd. Parallel light moving type exposure apparatus. 4,707,773, Cl. 362-303.000.

Miyamoto, Isao: *See—*
Yamano, Shoji; and Miyamoto, Isao, 4,706,766, Cl. 177-1.000.

Miyamoto, Toshio: *See—*
Matsuno, Yoshio; Miyamoto, Toshio; and Morita, Hideyo, 4,707,505, Cl. 523-203.000.

Miyao, Osami; Shiraki, Manabu; and Ohsaka, Masayuki, to Shicoh Engineering Co., Ltd. Single-phase brushless motor. 4,707,645, Cl. 318-254.000.

Miyashita, Kunio: *See—*
Takahashi, Tadashi; Miyashita, Kunio; and Kawamata, Syoichi, 4,707,695, Cl. 340-870.310.

Miyazaki, Yoshio: *See—*
Tajima, Shoji; Kadomatsu, Yasuo; Miyazaki, Yoshio; Sakurai, Michikazu; and Anze, Kimio, 4,707,382, Cl. 427-58.000.

Mizota, Hisakazu; and Kojima, Shinji, to Kawasaki Steel Corporation. Continuous caster including an electromagnetic stirring apparatus. 4,706,735, Cl. 164-504.000.

Mizushima, Toshio: *See—*
Asai, Masahiro; Mizushima, Toshio; Kawai, Toshiro; Akutsu, Shigemitsu; and Uozumi, Yoshiaki, 4,706,617, Cl. 123-65.0PE.

Mizutani, Masashi, to Konan Electric Co., Ltd. Case guard device for air filter and lubricator of compressed air system. 4,707,168, Cl. 55-274.000.

Mo och Domsjo AB: *See—*
Ahlstrand, Ove, 4,706,340, Cl. 19-296.000.

Mobil Oil Corporation: *See—*
Buckles, John J., 4,706,750, Cl. 166-271.000.

Mocker, Hans W., to Honeywell Inc. Rapid wavelength switching of IR lasers with Bragg cells. 4,707,835, Cl. 372-20.000.

Modglin, Rodger L.: *See—*
Loeber, Frederick W.; Cummins, Nolan W.; Modglin, Rodger L.; and Greene, George O., 4,706,723, Cl. 152-410.000.

Moeller, Reiner; Hetzel, Gert; Saugeon, Ulrich; Boheim, Gustav; and Zurinski, Viktor, to Siemens Aktiengesellschaft. Ultrasound apparatus permitting dynamic variation of the position of the reception focus. 4,707,813, Cl. 367-103.000.

Moeller, Rudolph H., to BioDynamic Technologies Inc. Apparatus for comminuting bone. 4,706,897, Cl. 241-37.500.

Mohr, Glenn R.; and Roth, Donald J., to Continental Can Company, Inc. Induction heating unit for heat bonding a lid having a metallic layer to a container. 4,707,213, Cl. 156-380.200.

Mohrlang, Harry, to Mohrlang Manufacturing, Inc. Feed mixer. 4,707,140, Cl. 366-186.000.

Mohrlang Manufacturing, Inc.: *See—*
Mohrlang, Harry, 4,707,140, Cl. 366-186.000.

Molded Parts Specialists: *See—*
Walthall, B. Kenneth, 4,706,592, Cl. 114-153.000.

Molex Incorporated: *See—*
Michaels, Leonard H.; and Miller, Robert A., 4,707,047, Cl. 439-271.000.

Monarch Marking Systems, Inc.: *See—*
Strausburg, Larry D., 4,706,362, Cl. 29-432.000.

Monch, Heiner, to American Standard Inc. Mixing valve assembly. 4,706,709, Cl. 137-597.000.

Monsanto Company: *See—*
Baer, Massimo, 4,707,513, Cl. 524-504.000.
Gomez, I. Luis, 4,707,304, Cl. 252-609.000.

Monteith, Robert C.; and Borgmann, Robert E., to Cincinnati Milacron Inc. Laser wrist with sealed beam pathway. 4,707,585, Cl. 219-121.0LV.

Montrone, Dale L.; and Lewis, Edward T., to Raytheon Company. Adder/substractor for variable length numbers. 4,707,800, Cl. 364-788.000.

Moody, Charistopher J.: *See—*
Harvey, David M.; and Moody, Charistopher J., 4,706,887, Cl. 239-453.000.

Moon-Kau, David T., to Chiaphua Industries Limited. Food processor. 4,706,896, Cl. 241-37.500.

Mooney, Charles W.; Phipps, Robert E.; and Kuznicki, William J., to Motorola, Inc. Self-locating, self-fixturing hard crystal blank mounting system. 4,706,350, Cl. 29-25.350.

Moore, Alfred J., Jr.: *See—*
Greenhill, Daniel J., Sr.; and Moore, Alfred J., Jr., 4,706,359, Cl. 29-271.000.

Moore Business Forms, Inc.: *See—*
Fasham, Thomas I. K., 4,706,996, Cl. 282-1.00R.
Jenkins, Richard A., 4,706,877, Cl. 229-73.000.

Moorman, Charles T.: *See*—
Vogel, Gerald J.; Kearney, Donald T.; Akpinar, Belkis K.; and Moorman, Charles T., 4,707,368, Cl. 426-386.000.

Moran, Ellen: *See*—
Zollinger, Wendell D.; Boslego, John; Moran, Ellen; Brandt, Brenda; Collins, Hugh; Mandrell, Robert; Altieri, Patricia; and Berman, Sanford, 4,707,543, Cl. 530-402.000.

Moreno, Frederick E.; and Hartman, Creighton D., to PruTech II. Turbine exhaust fed low NO_x staged combustor for TEOR power and steam generation with turbine exhaust bypass to the convection stage. 4,706,612, Cl. 122-7.00R.

Morgan, Charles, Jr. Livestock data indicator. 4,706,610, Cl. 119-156.000.

Morgan Construction Company: *See*—
Gilvar, Martin; Woodrow, Harold E.; and Nasrah, Camille S., 4,706,485, Cl. 72-239.000.

Morgner, Friedrich W.; and Hock, Franz, to Temafa Textilmaschinenfabrik. Apparatus for mixing textile fibers. 4,706,337, Cl. 19-80.00R.

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Mori, Yoshiaka: *See*—
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Morita, Kazumasa: *See*—
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Moro, Dominik J.; Reisinger, Robert R.; Larson, James M.; and Kuhn, Roscoe E., to Acco Babcock Inc. Crane with anti-skewing device. 4,706,570, Cl. 105-163.200.

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Morse, John J., III: *See*—
Epel, Joseph N.; Morse, John J., III; and Trebilcock, Terry N., 4,707,317, Cl. 264-136.000.

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Manser, Gerald E.; and Fletcher, Richard W., 4,707,540, Cl. 528-417.000.
Stevens, George L., 4,706,990, Cl. 280-734.000.

Moser, Kurt: *See*—
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Folk, Lee E.; and Asher, Reginald K., 4,707,722, Cl. 357-67.000.
Legge, Ronald N., 4,706,870, Cl. 228-123.000.
Mooney, Charles W.; Phipps, Robert E.; and Kuznicki, William J., 4,706,350, Cl. 29-25.350.

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Mues, Peter; Kerimis, Dimitrios; Muller, Hanns P.; and Buysch, Hans-Josef, to Bayer Aktiengesellschaft. Process for the preparation of thermosetting aliphatic polycarbonate with quaternary salt catalyst. 4,707,539, Cl. 528-371.000.

Mukaida, Yoshito: *See*—
Hashimoto, Hiroshi; Okita, Tsutomu; and Mukaida, Yoshito, 4,707,380, Cl. 427-40.000.

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Muraoka, Kenichi; Setoguchi, Yoichi; Kawase, Tadamasa; Kawata, Hiroitsu; Komatsu, Hisamoto; and Uchida, Makoto, to Yamanouchi Pharmaceutical Co., Ltd. Granular composition of difficult digestible polysaccharides. 4,707,376, Cl. 426-658.000.

Murasaki, Ryuichi, to Yoshida Kogyo, K. K. Mandrel for use with loom for forming loops of surface-type fasteners. 4,706,715, Cl. 139-46.000.

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Murken, Joseph S., to Dayco Products, Inc. Hose construction, coupling arrangement therefor and method of making the same. 4,707,262, Cl. 210-448.000.

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Nagai, Yoichiro; Watanabe, Hamao; and Akutsu, Yoshinori, to Yuki Gosei Kogyo Co., Ltd. 1,1-dichloro-1,2,2-trimethyl-2-phenyldisilane and method for producing the same. 4,707,557, Cl. 556-430.000.

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Nakaoji, Kazuhiko; Kamao, Mitsugu; Itoh, Hayami; Tatsumi, Shuhei; and Takao, Shoichi, to Lion Corporation; Kao Corporation; Mitsui Engineering and Shipbuilding Company Limited; Electric Power Development Company Limited; and Kawasaki Jukogyo Kabushiki Kaisha. Process for producing high concentration coal-water slurry. 4,706,891, Cl. 241-16.000.
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Narusawa, Sadayuki; and Tomisawa, Norio, to Nippon Gakki Seizo Kabushiki Kaisha. Data processing circuit for digital audio system. 4,707,805, Cl. 364-900.000.
Nason, Frederic L. Specimen collection and test unit. 4,707,450, Cl. 435-295.000.
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Neese, Gerhard, to FAG Kugelfischer Georg Schafer (KGaA). Cage for tapered roller bearings. 4,707,152, Cl. 384-572.000.
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Nelson, Bill W. Methods and apparatus for producing steam without a boiler. 4,706,611, Cl. 122-5.50A.
Nelson, David; Biddison, William; Rubin, Laurence; Greene, Warner; Leonard, Warren; and Yarchoan, Robert, to United States of America, Health and Human Services. Soluble interleukin-2 receptor as a disease indicator and a method of assaying the same. 4,707,443, Cl. 435-7.000.
Nelson Industries, Inc.: *See*—
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Nelson, Robert E.: *See*—
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Nelson, Thomas W.: *See*—
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Nemnich, Charles; and Hoyt, Charles D., to Ferrotec, Inc. Apparatus and method for measuring movement. 4,706,498, Cl. 73-516.00R.

Nepera Inc.: *See*—
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Thomas, Michael; Neumann, Peter; Wegerle, Dieter; and Krallmann, Reinhold, 4,707,161, Cl. 8-442.000.

Neuroth, David H.: *See*—
Hoffman, Ernest G.; and Neuroth, David H., 4,707,568, Cl. 174-103.000.

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Ney, Reuben E.; and Walters, Bryon L., to AMP Incorporated. Shielded microminiature multi-pin connector. 4,707,045, Cl. 439-588.000.

Ngadi, Sumiaty; and Chu, David T. Racket frame clamp for stringing machine. 4,706,955, Cl. 273-73.00A.

Ngo, Giang T., to Eastman Kodak Company. Latch mechanism for camera shutter. 4,707,099, Cl. 354-251.000.

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Nichols, Roberta J.: *See*—
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Nicolas, Yvon M. Orthodontic toothbrush. 4,706,322, Cl. 15-106.000.

Nielsen, Bent A. Trigger mechanism for a weapon. 4,706,401, Cl. 42-69.030.

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Nihei, Mitsuo: *See*—
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Nippon Kogaku K. K.: *See*—
Akabane, Jun; and Suyama, Hitoshi, 4,707,101, Cl. 354-289.100.
Wakamiya, Koichi, 4,707,098, Cl. 354-219.000.

Nippon Kogaku K.K.: *See*—
Nakano, Yoshiyuki; and Takemae, Mikio, 4,707,095, Cl. 354-173.110.
Okano, Hiroshi; Kanno, Hideo; and Ohmori, Sachio, 4,707,100, Cl. 354-273.000.

Nippon Mining Co., Ltd.: *See*—
Kaimai, Takashi; and Kusayanagi, Sampo, 4,707,280, Cl. 252-49.600.

Nippon Oil Co., Ltd.: *See*—
Sasaki, Makoto; Yamakawa, Masaki; Hirose, Toshifumi; and Isayama, Katsuhiko, 4,707,526, Cl. 525-404.000.

Nippon Oil and Fats Co., Ltd.: *See*—
Toyama, Takashi; Ohno, Masashi; Ishii, Kiminori; Yamamoto, Shosaku; and Kakinuma, Kazuo, 4,707,381, Cl. 427-407.100.

Nippon Signal Co., Ltd., The: *See*—
Murata, Yasuzo; Yokoyama, Takeo; Wada, Hiroyuki; and Sakurai, Masaaki, 4,707,593, Cl. 235-487.000.

Nippon Soken, Inc: *See*—
Tashiro, Syuzaburo; Ina, Toshikazu; Taguchi, Masahiro; Onimaru, Sadahisa; Nakano, Osamu; and Kuno, Akira, 4,707,788, Cl. 364-424.000.

Nippon Valqua Kogyo Kabushiki Kaisha: *See*—
Kawahigashi, Nobuo; Hashida, Shigesou; and Kojima, Yasunobu, 4,707,314, Cl. 264-127.000.

Nippon Zeon Co., Ltd.: *See*—
Hata, Kotaro; and Nakamura, Eitaro, 4,707,410, Cl. 428-413.000.
Joh, Yasushi; and Nagase, Toshio, 4,707,315, Cl. 264-129.000.
Nakayama, Akira; Nakamura, Katsuya; Hata, Kotaro; and Yamamoto, Makoto, 4,707,411, Cl. 428-413.000.

Nippondenso Co., Ltd.: *See*—
Tashiro, Syuzaburo; Ina, Toshikazu; Taguchi, Masahiro; Onimaru, Sadahisa; Nakano, Osamu; and Kuno, Akira, 4,707,788, Cl. 364-424.000.

Nirasawa, Mitsuharu: *See*—
Seshimoto, Osamu; and Nirasawa, Mitsuharu, 4,707,243, Cl. 204-418.000.

Nishi, Kazuhiko: *See*—
Akazawa, Naoki; Nishi, Kazuhiko; Kawakami, Naoya; Fujisawa, Yoshiaki; and Yamada, Noriyoshi, 4,706,470, Cl. 62-209.000.

Nishi, Tomoya; Amari, Mitsuhiro; and Suzuki, Kenji, to Hitachi, Ltd. Printer controller. 4,707,153, Cl. 400-121.000.

Nishida, Minoru: *See*—
Honma, Toshio; Nishida, Minoru; and Yamauchi, Kiyoshi, 4,707,196, Cl. 148-12.70N.

Nishihara, Kunio: *See*—
Sasagawa, Katsuyoshi; Nishihara, Kunio; Ozawa, Hiroshi; and Imai, Masao, 4,707,425, Cl. 430-21.000.

Nishijima, Hideo; Okamoto, Kaneyuki; Ito, Takayasu; and Toyoshima, Shuji, to Hitachi, Ltd. Address code inserting system for video tape recording apparatus. 4,707,749, Cl. 360-14.300.

Nishikawa, Masao; Aoki, Takashi; and Sakurai, Yoshimi, to Honda Giken Kogyo Kabushiki Kaisha. Automatic transmission with upshift smoothing valve. 4,706,523, Cl. 74-869.000.

Nishikawa, Shunji, to Nec Home Electronics Ltd. Projection television receiver with a retractable reflector. 4,707,746, Cl. 358-231.000.

Nishikawa, Toshihide; Hanada, Kenichirou; Nishimura, Yukinobu; and Shimomura, Setsuhiro, to Mazda Motor Corporation; and Mitsubishi Denki Kabushiki Kaisha. Fuel-injection control system. 4,706,634, Cl. 123-492.000.

Nishikawa, Toyotaka: *See*—
Motoyama, Masanori; Nishikawa, Toyotaka; and Nakagawa, Masashi, 4,707,675, Cl. 335-130.000.

Nishimori, Shozo; and Eguma, Chikashi, to Shiraimatsu Shinyaku Kabushiki Kaisha. Water treatment package. 4,707,263, Cl. 210-484.000.

Nishimoto, Takashi: *See*—
Sugita, Minoru; Nakatsuji, Teruyuki; Fujisaki, Tadashi; Hiraga, Hisao; Nishimoto, Takashi; and Futagawa, Minoru, 4,706,430, Cl. 52-309.160.

Nishimura, Kosuke: *See*—
Hashimoto, Shintaro; Masuzawa, Sigeaki; Kunita, Hisao; Inoue, Tomohiro; and Nishimura, Kosuke, 4,707,794, Cl. 364-513.500.

Nishimura, Yukinobu: *See*—
Nishikawa, Toshihide; Hanada, Kenichirou; Nishimura, Yukinobu; and Shimomura, Setsuhiro, 4,706,634, Cl. 123-492.000.

Nishioka, Hisao: *See*—
Suzuki, Tadao; Nakamura, Shoichi; Nishioka, Hisao; and Ohkubo, Yutaka, 4,707,818, Cl. 369-59.000.

Nishioka, Sunao; and Takemae, Mikio, to Nippon Kagaku K. K. Apparatus for fixing exposure and focus in camera. 4,707,105, Cl. 354-412.000.

Nissan Motor Co., Ltd.: *See*—
Iijima, Yoshitaka; and Noguchi, Hiroshi, 4,706,989, Cl. 280-701.000.
Ito, Ken, 4,706,978, Cl. 280-91.000.
Kasanami, Mitsuru; and Tamura, Hideyuki, 4,706,632, Cl. 123-492.000.
Kawabe, Taketoshi; and Ito, Ken, 4,706,979, Cl. 280-91.000.
Kawabe, Taketosi; and Ito, Ken, 4,706,771, Cl. 180-142.000.
Matsuda, Toshiro, 4,707,758, Cl. 361-18.000.
Matsuno, Yoshio; Miyamoto, Toahio; and Morita, Hideyo, 4,707,505, Cl. 523-203.000.
Murakami, Koichi, 4,706,374, Cl. 437-225.000.
Nakagawa, Toyoaki, 4,706,633, Cl. 123-491.000.
Nakagawa, Toyoaki; and Kai, Shisei, 4,707,241, Cl. 204-406.000.
Toyama, Takashi; Ohno, Masashi; Ishii, Kiminori; Yamamoto, Shosaku; and Kakinuma, Kazuo, 4,707,381, Cl. 427-407.100.

Nithart, Henri; and Graftiaux, Robert, to Alsthom; and R. Graftaiux. Taping machine for hot taping an electrical conductor. 4,707,214, Cl. 156-392.000.

Nitto Boseki Co., Ltd.: *See*—
Kasai, Shin; Waketa, Hideharu; Kato, Keiichi; and Kawaguchi, Yutaka, 4,707,565, Cl. 174-68.500.

Nitto Electric Industrial Co., Ltd.: *See*—
Ikeyama, Norio; Yoshioka, Noriaki; Tamaru, Shusaku; and Ichinose, Hisashi, 4,707,261, Cl. 210-433.200.

Nitz, Larry T., to General Motors Corporation. Step-out clutch-to-clutch upshift control. 4,706,522, Cl. 74-866.000.

Nitz, Larry T.: *See*—
Downs, Robert C.; Nitz, Larry T.; and Wanamaker, Joseph L., 4,707,789, Cl. 364-424.100.

Niwa, Toshio; Himeno, Kiyoshi; and Hihara, Toshio, to Mitsubishi Chemical Industries Limited. Reactive monoazo dyestuffs. 4,707,546, Cl. 534-635.000.

Nobel Kemi AB: *See*—
Schmid, Hermann; Sjoberg, Per; and Svensson, Leif, 4,706,567, Cl. 102-318.000.

Nobell Inc.: *See*—
Pasinski, Ralph R.; Ayers, Sammy L., Jr.; and Kocmond, Warren C., Jr., 4,707,855, Cl. 379-376.000.

Nogi, Hiroshi: *See*—
Takeuchi, Kunihiko; and Nogi, Hiroshi, 4,706,703, Cl. 137-487.500.

Noguchi, Hiroshi: *See*—
Iijima, Yoshitaka; and Noguchi, Hiroshi, 4,706,989, Cl. 280-701.000.

Noguchi, Kouki: *See*—
Sakai, Yoshio; Nagai, Ryo; Yamamoto, Shuichi; Nakamura, Hideo; and Noguchi, Kouki, 4,707,718, Cl. 357-45.000.

Nolan, Daniel: *See*—
Forsuto, Joseph; Gifford, William E.; Nolan, Daniel; and Sherwood, Carl H., 4,706,708, Cl. 137-588.000.

Nomura, Etsuzo: *See*—
Senda, Yutaka; Sato, Katsuhiko; Kozawa, Tetsuo; Nomura, Etsuzo; and Sakakibara, Yasuo, 4,706,584, Cl. 112-121.110.

Nomura, Tetsuro, to Sanki Vinyl Kabushiki Kaisha. Pile. 4,706,396, Cl. 40-124.200.

Nordischer Maschinenbau Rud. Baader GmbH & Co. KG: *See*—
Hartmann, Franz; and Matern, Klaus, 4,706,336, Cl. 17-55.000.

Norex, Don W. Heat exchanger. 4,706,739, Cl. 165-104.140.

Norris, Brian, to Rohr Industries, Inc. Method of bonding columbium to nickel and nickel based alloys using low bonding pressures and temperatures. 4,706,872, Cl. 228-194.000.

North American Philips Corporation: *See*—
Suppinger, Albert V.; and Tinley, Charles W., 4,706,382, Cl. 29-879.000.

North, Lawrence A.: *See*—
McKernon, David A.; and North, Lawrence A., 4,706,512, Cl. 74-405.000.

Northern Telecom Limited: *See*—
Akre, Collin A., 4,706,449, Cl. 57-6.000.

Nortoft, Soren B., to V. Kann Rasmussen Industri A/S. Electric control of venetian blind. 4,706,726, Cl. 160-168.00R.

Novicki, Eduardo M.: *See*—
Silva, Julio C.; Gsiao, Ubirajara; and Novicki, Eduardo M., 4,707,248, Cl. 208-409.000.

Nowacki, K. Kristine: *See*—
Nowacki, Robert S.; and Nowacki, K. Kristine, 4,706,960, Cl. 273-257.000.

Nowacki, Robert S.; and Nowacki, K. Kristine. Fields of law and legal process card and board game apparatus. 4,706,960, Cl. 273-257.000.

Nozawa, Seiichi: *See*—
Yoneda, Norihiko; Fukuhara, Tsuyoshi; and Nozawa, Seiichi, 4,707,536, Cl. 528-198.000.

N'timkulu, Thabiso: *See*—
Geigert, John; Liu, Te-Ning E.; and N'timkulu, Thabiso, 4,707,446, Cl. 435-132.000.

Nudd, Graham R.; and Marom, Emanuel, to Hughes Aircraft Company. Apparatus for high speed analysis of two-dimensional images. 4,707,859, Cl. 382-28.000.

Nugent, Adam, Jr.: *See*—
Roark, David N.; Nugent, Adam, Jr.; and Bandlish, Baldev K., 4,706,755, Cl. 166-295.000.

Nugent, John L.; Rush, George C.; and Matthews, Norman G., to Westinghouse Electric Corp. Low noise signal generator. 4,707,665, Cl. 328-14.000.

Nukem GmbH: *See*—
Hewig, Gert; Schurich, Bernd; Worner, Jorg; and Schock, Hans-Werner, 4,707,561, Cl. 136-256.000.

Numata, Shinichi: *See*—
Kakizaki, Takehiro; Araki, Shoji; and Numata, Shinichi, 4,707,634, Cl. 313-432.000.

Nuwayser, Elie S., to Biotek, Inc. Sustained release composition. 4,707,362, Cl. 424-433.000.

Nylund, Olov: *See*—
Arbink, Richard; and Nylund, Olov, 4,707,328, Cl. 376-446.000.

Nytomt, Jan G.: *See*—
Johansson, Sven H.; and Nytomt, Jan G., 4,706,638, Cl. 123-647.000.

Oakwood Lymber & Millwork Co. Limited: *See*—
Corvese, Vincent, 4,706,431, Cl. 52-313.000.

Obley, Alan L., to Westinghouse Electric Corp. Dynamoelectric machine roll back collector housing. 4,707,628, Cl. 310-89.000.

Occidental Chemical Corporation: *See*—
Markezich, Ronald L., 4,707,506, Cl. 524-89.000.

Ochiai, Yoshitaka: *See*—
Hayakawa, Masatoshi; Aso, Koichi; Ochiai, Yoshitaka; Matsuda, Hideki; Hayashi, Kazuhiko; Ishikawa, Wataru; and Iwasaki, You, 4,707,417, Cl. 428-630.000.

Ochsner, Hans W., to General Motors Corporation. Valve guide seal device. 4,706,967, Cl. 277-33.000.

Office National d'Etudes et de Recherche Aerospatiales: *See*—
Destuynder, Roger; Bouttes, Jacques; and Poisson-Quinton, Philippe, 4,706,902, Cl. 244-76.00C.

Ogasawara, Tadashi: *See*—
Okada, Hiroshi; Tsujiuchi, Toshio; and Ogasawara, Tadashi, 4,706,415, Cl. 51-165.00R.

Ogawa, Junji: *See*—
Takemae, Yoshihiro; Nakano, Tomio; Tatematsu, Takeo; Ogawa, Junji; Horii, Takashi; Fujii, Yasuhiro; Nakano, Masao; and Tsuge, Norihisa, deceased, 4,707,806, Cl. 365-96.000.

Ogawa, Kazufumi, to Matsushita Electric Industrial Co., Ltd. Water-soluble photosensitive material with dichromate and low molecular weight gelatin. 4,707,433, Cl. 430-289.000.

Ogburn, Alan P.: *See*—
Draper, Francis R.; Francis, John H.; and Ogburn, Alan P., 4,706,635, Cl. 123-506.000.

Ogiu, Hisao; and Kaiya, Haruhiko, to Olympus Optical Co., Ltd. Endoscope having internal pressure communication means. 4,706,654, Cl. 128-4.000.

Ogle, Douglas R.; Richey, Daniel D.; and Whitehurst, James L., to General Motors Corporation. Electric engine starter. 4,707,616, Cl. 290-48.000.

Oglesby, Donald L.; and Simnamon, Robert H., to Dayco Products, Inc. Hose construction. 4,706,712, Cl. 138-126.000.

Oguni, Kensaku; Ishibene, Kyuhei; Kuroda, Shigeaki; Yasuda, Hiromu; Sano, Takashi; and Etou, Hironori, to Hitachi, Ltd. Refrigerant flow control system for use with refrigerator. 4,706,469, Cl. 62-222.000.

Ogura, Shigetaro; and Handa, Yuichi, to Canon Kabushiki Kaisha. Integrated optical circuit element and method of making the same. 4,707,059, Cl. 350-96.130.

Ogura, Takashi; Tanaka, Koichi; Taniguchi, Koji; Yoshida, Masaru; and Mikami, Akiyoshi, to Sharp Kabushiki Kaisha. Thin film EL devices and process for producing the same. 4,707,419, Cl. 428-690.000.

Oguri, Shigenori, to Nippon Gakki Seizo Kabushiki Kaisha. Tone signal generation device. 4,706,537, Cl. 84-1.030.

Ohashi, Shigeo, to Nihon Kaiheiki Kogyo Kabushiki Kaisha. Printed wiring board mounted control instrument. 4,707,765, Cl. 361-401.000.

Ohashi, Yoshio, to Kanaaka Co., Ltd. Ladder attaching device. 4,706,780, Cl. 182-93.000.

Ohba, Masaru: *See*—
Kishine, Toshiaki; Izawa, Hideo; and Ohba, Masaru, 4,706,566, Cl. 101-426.000.

Ohbayashi-Gumi, Ltd.: *See*—
Adachi, Toshio; Aoyagi, Toru; Kawaguchi, Akihisa; and Yamanaka, Shigeki, 4,706,419, Cl. 52-65.000.

Ohdake, Eisyu: *See*—
Ohshima, Kiyoshi; Suzuki, Shigeru; Mashiko, Harumitsu; and Ohdake, Eisyu, 4,707,126, Cl. 355-14.0SH.

Ohe, Junzo; and Kondo, Hiroshi, to Toyota Jidosha Kabushiki Kaisha. Automobile antenna system. 4,707,701, Cl. 343-712.000.

Ohji, Nobuaki: *See*—
Takahashi, Fumitaka; Kimura, Yoshihiko; Taubata, Hideo; Ohji, Nobuaki; and Sashida, Kiyoshi, 4,707,057, Cl. 350-96.120.

Ohkochi, Katsutoshi; Shinozaki, Mamoru; Ohshita, Toshiyuki; Kitano, Masayasu; and Kamata, Seizo, to Takanaka Komuten Co., Ltd. Method and device for conveying chemicals through borehole. 4,706,753, Cl. 166-286.000.

Ohkubo, Masaharu: *See*—
Ohtsuka, Yasumasa; and Ohkubo, Masaharu, 4,707,748, Cl. 358-298.000.

Ohkubo, Yutaka: *See*—
Suzuki, Tadao; Nakamura, Shoichi; Nishioka, Hisao; and Ohkubo, Yutaka, 4,707,818, Cl. 369-59.000.

Ohkuni, Shinichiro; and Tamada, Shinichi, to Bridgestone Tire Company Limited. Pneumatic tires for motorcycles. 4,706,724, Cl. 152-454.000.

Ohlbach, Ralph C., to Conductive Containers, Inc. Conductive container. 4,706,438, Cl. 53-410.000.

Ohlig, Ernest; and Sloop, Conrad B., to Ohlig, Ernest. Photographic registration apparatus and method. 4,707,125, Cl. 355-94.000.

Ohmori, Sachio: *See*—
Okano, Hiroshi; Kanno, Hideo; and Ohmori, Sachio, 4,707,100, Cl. 354-273.000.

Ohno: Akio, to Canon Kabushiki Kaisha. Image forming apparatus having movable developing means and means for removing developer therefrom. 4,707,108, Cl. 355-4.000.

Ohno, Masashi: *See*—
Toyama, Takashi; Ohno, Masashi; Ishii, Kiminori; Yamamoto, Shosaku; and Kakinuma, Kazuo, 4,707,381, Cl. 427-407.100.

Ohno, Tadayoshi, to Kabushiki Kaisha Toshiba. Thermal-transfer ink ribbon. 4,707,707, Cl. 346-76.0PH.

Ohnuma, Teruyuki: *See*—
Ide, Yukio; Ohnuma, Teruyuki; and Kageyama, Yoshiyuki, 4,707,570, Cl. 178-18.000.

Ohsaka, Masayuki: *See*—
Miyao, Osami; Shiraki, Manabu; and Ohsaka, Masayuki, 4,707,645, Cl. 318-254.000.

Ohshima, Kiyoshi; Suzuki, Shigeru; Mashiko, Harumitsu; and Ohdake, Eisyu, to Ricoh Company, Ltd. Method of positioning original image to be copied and apparatus for performing the same. 4,707,126, Cl. 355-14.0SH.

Ohshita, Toshiyuki: *See*—
Ohkochi, Katsutoshi; Shinozaki, Mamoru; Ohshita, Toshiyuki; Kitano, Masayasu; and Kamata, Seizo, 4,706,753, Cl. 166-286.000.

Ohta, Norio; Okamine, Shigenori; Sugita, Yutaka; Seo, Yosuke; and Tamura, Takashi, to Hitachi, Ltd. Optical read-out magnetic head. 4,707,755, Cl. 360-114.000.

Ohtake, Masatoshi: *See*—
Yonezawa, Seiji; Ohtake, Masatoshi; Ito, Masaru; Tsuyoshi, Toshiaki; Ichino, Kazuo; and Nakagaki, Harushige, 4,707,816, Cl. 369-44.000.

Ohtsuji, Masahiko: *See*—
Takenaka, Kiyoshi; Ohtsuji, Masahiko; and Kabuto, Hiroaki, 4,707,117, Cl. 355-3.0SH.

Ohtsuka, Yasumasa; and Ohkubo, Masaharu, to Canon Kabushiki Kaisha. Image recording apparatus. 4,707,748, Cl. 358-298.000.

Ohtsuki, Tomonari: *See*—
Kato, Matsuo; Ohtsuki, Tomonari; Hashimoto, Kazuya; and Nakaide, Masami, 4,706,381, Cl. 29-857.000.

Ohue, Kazuto; Kondou, Toshiyuki; Takeuchi, Hisaharu; and Ikeda, Yuzo, to Asahi Kasei Kogyo Kabushiki Kaisha. Method for separating an oil from an oil-containing liquid. 4,707,269, Cl. 210-651.000.

Ojima, Juji; and Kitamura, Yosiharu, to NHK Spring Co. Limited. Television stand having a tilt mechanism. 4,706,920, Cl. 248-371.000.
Okada, Fumio: *See*—
Itoh, Kunio; Okada, Fumio; Yamamoto, Yasushi; and Aoki, Hisashi, 4,707,503, Cl. 522-99.000.
Okada, Hiroshi; Tsujiuchi, Toshio; and Ogasawara, Tadashi, to Toyoda Koki Kabushiki Kaisha. Numerical control machine tool with manual feed handle. 4,706,415, Cl. 51-165.00R.
Okamine, Shigenori: *See*—
Ohta, Norio; Okamine, Shigenori; Sugita, Yutaka; Seo, Yosuke; and Tamura, Takashi, 4,707,755, Cl. 360-114.000.
Okamoto, Kaneyuki: *See*—
Nishijima, Hideo; Okamoto, Kaneyuki; Ito, Takayasu; and Toyoshima, Shuji, 4,707,749, Cl. 360-14.300.
Okamoto, Tatsuo; Shimizu, Masahiro; and Tsukamoto, Katsuhiro, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor device using a refractory metal as an electrode and interconnection. 4,707,723, Cl. 357-67.000.
Okano, Hiroshi; Kanno, Hideo; and Ohmori, Sachio, to Nippon Kogaku K.K. Device for locking the operation ring of photographing lens. 4,707,100, Cl. 354-273.000.
Okazaki, Kiyoshi, to Mitsubishi Mining & Cement Co., Ltd. Method of manufacturing silica-free interconnected porous ceramics. 4,707,311, Cl. 264-43.000.
Okimoto, Haruo; and Tashima, Seiji, to Mazda Motor Corporation. Intake systems for rotary piston engines. 4,706,621, Cl. 123-216.000.
Okita, Tsutomu: *See*—
Hashimoto, Hiroshi; Okita, Tsutomu; and Mukaida, Yoshito, 4,707,380, Cl. 427-40.000.
Okubo, Tadanobu. Method of processing a metal surface. 4,707,238, Cl. 204-192.310.
Okuni, Shinichiro; and Kitazawa, Yoichi, to Bridgestone Tire Company Limited. Pneumatic semi-radial tires for motorcycles. 4,706,725, Cl. 152-541.000.
Okuzawa, Yasutoshi: *See*—
Kato, Mikihiko; Okuzawa, Yasutoshi; Komine, Shigeo; and Morita, Kazuhiko, 4,707,392, Cl. 428-65.000.
Olaf Fjeldsend A/S: *See*—
Fjeldsend, Olaf, Jr., 4,707,255, Cl. 210-222.000.
Olaker, David A.: *See*—
Andren, Carl F.; and Olaker, David A., 4,707,839, Cl. 375-1.000.
Oliff, James R.: *See*—
Baugus, Gary; and Oliff, James R., 4,706,814, Cl. 206-427.000.
Olson, Gary L.: *See*—
Berger, Leo; Dairman, Wallace M.; Mowles, Thomas F.; and Olson, Gary L., 4,707,484, Cl. 514-278.000.
Olympus Optical Co., Ltd.: *See*—
Kuboto, Tetsumaru, 4,706,656, Cl. 128-6.000.
Ogiu, Hisao; and Kaiya, Haruhiko, 4,706,654, Cl. 128-4.000.
Yamamoto, Tsutomu, 4,706,653, Cl. 128-4.000.
Omdoll, Paul A.; and Collins, Scott J., to San Jamar, Inc. Napkin dispenser. 4,706,844, Cl. 221-59.000.
Omega SA: *See*—
Aellen, Pierre-Andre ; and Gagnebin, Gaston, 4,706,857, Cl. 224-164.000.
Omron Tateisi Electronics Co.: *See*—
Takagi, Hiroshi, 4,707,785, Cl. 364-405.000.
O'Neil, Gerald L.: *See*—
Schram, Harlan L.; and O'Neil, Gerald L., 4,706,335, Cl. 17-23.000.
O'Neill, John J.: *See*—
Miller, James W.; and O'Neill, John J., 4,707,281, Cl. 252-8.514.
Onimaru, Sadahisa: *See*—
Tashiro, Syuzaburo; Ina, Toshikazu; Taguchi, Masahiro; Onimaru, Sadahisa; Nakano, Osamu; and Kuno, Akira, 4,707,788, Cl. 364-424.000.
Ono, Jun: *See*—
Enokida, Susumu; and Ono, Jun, 4,707,020, Cl. 296-191.000.
Onoe, Hiroyasu: *See*—
Ueyama, Seiji; and Onoe, Hiroyasu, 4,707,395, Cl. 428-212.000.
Onozawa, Makoto; Osawa, Michitaka; Maekawa, Hitoshi; and Kito, Koji, to Hitachi, Ltd. Horizontal deflection output circuit. 4,707,640, Cl. 315-408.000.
Opitz, Reinhard: *See*—
Portz, Heinz; and Opitz, Reinhard, 4,707,193, Cl. 148-6.15Z.
Optical Disc Corporation: *See*—
Dakin, W. Ray, 4,707,670, Cl. 332-19.000.
ORC Manufacturing Co., Ltd.: *See*—
Miyamoto, Hiroshi, 4,707,773, Cl. 362-303.000.
Orimo, Katsumi: *See*—
Kawazoe, Hideyo; Iino, Akira; and Orimo, Katsumi, 4,707,173, Cl. 65-3.120.
Orlowski, David C. Sealing rings with complimentary ring members. 4,706,968, Cl. 277-53.000.
Ormsbee, Herbert S., III: *See*—
Bondinell, William E.; Wen-Fu Ku, Thomas; and Ormsbee, Herbert S., III, 4,707,483, Cl. 514-273.000.
Ortho Pharmaceutical: *See*—
Rosenthale, Marvin E.; Shriver, David A.; and Katz, Laurence B., 4,707,495, Cl. 514-530.000.
Ortho Pharmaceutical Corporation: *See*—
Press, Jeffery B.; and Russell, Ronald K., 4,707,550, Cl. 544-379.000.
Ortmanns, Gunter: *See*—
Mattes, Gunther; and Ortmanns, Gunter, 4,707,383, Cl. 427-168.000.
Osawa, Michitaka: *See*—
Onozawa, Makoto; Osawa, Michitaka; Maekawa, Hitoshi; and Kito, Koji, 4,707,640, Cl. 315-408.000.
Osterling, Jost: *See*—
Besche, Anton; Osterling, Jost; and Schwarze, Klaus, 4,707,203, Cl. 156-85.000.
Ostlie, L. David. Method and system to provide thermal power for a power plant. 4,706,645, Cl. 126-810.00R.
Ostrovsky, Mikhail V.: *See*—
Hayes, Michael E.; Hass, Gary R.; Sharpe, Robert; Nestaas, Eirik; and Ostrovsky, Mikhail V., 4,706,749, Cl. 166-267.000.
Otani, Mitsunobu: *See*—
Nagayama, Takashi; Otani, Mitsunobu; and Date, Tamotsu, 4,707,260, Cl. 210-386.000.
Ott, Gunther: *See*—
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de Neufville, John P.; Rajoria, Dalbir; and Ovshinsky, Stanford R., 4,707,422, Cl. 429-48.000.
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Li, Ernest L., 4,706,829, Cl. 215-354.000.
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Padfield, Barbara J.; and Spector, George. Comfort pad. 4,706,302, Cl. 2-22.000.
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Pallmer, Michael: *See*—
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Palmere, George D. Swimming pool liner and tile border receptor. 4,706,308, Cl. 4-496.000.
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Haberland, Detlef; Langenwalter, Michael; Panzer, Klaus; Rosen, Hans G.; Spaeter, Lothar; Spaeth, Werner; Seibert, Bernd; and Haltenorth, Helmut, 4,707,067, Cl. 350-96.200.
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Jacobsen, William M.; and Parker, Andrew L., 4,706,864, Cl. 227-109.000.
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Rogers, Walter C., Jr., 4,707,025, Cl. 297-259.000.
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Parsi, Edgardo J.; Sims, Keith J.; and Goldstein, Arthur L., to Ionics Incorporated. Method and apparatus for improving the life of an electrode. 4,707,240, Cl. 204-290.00F.
Pasinski, Ralph R.; Ayers, Sammy L., Jr.; and Kocmond, Warren C., Jr., to Nobell Inc. Personalized telephone signaling circuitry and device, and methods of constructing and utilizing same. 4,707,855, Cl. 379-376.000.
Paske, Richard, Jr.; Pallmer, Michael; and King, William L., Jr., to Bell & Howell Company. Removable guidepath for automated guidance vehicles. 4,707,297, Cl. 252-301.160.
Paskowski, Frank J., Jr.: *See—*
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Patrick, James W.; Heinemann, Stephen F.; Boss, Barbara D.; and Cowan, W. Maxwell, to Salk Institute for Biological Studies, The. Synthetic peptide-based anti-rabies compositions and methods. 4,707,356, Cl. 424-88.000.
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Paulin, Dale W. Antenna post base support and method of installing same. 4,706,921, Cl. 248-345.000.
Peck, Carl C., to United States of America, Army. Dermal substance collection device. 4,706,676, Cl. 128-632.000.
Peise, Helmut: *See—*
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Pendse, Sudhir B., to Racal Data Communications Inc. CSMA-CD with channel capture. 4,707,829, Cl. 370-86.000.
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Peppel, George W.; and Sullivan, Paul E., to Lockheed Corporation. Axial displacement coupling. 4,706,998, Cl. 285-167.000.
Perkin-Elmer Corporation, The: *See—*
Labinger, Richard L.; Tinnerino, Natale F.; and Bryant, Timothy E., 4,707,734, Cl. 358-106.000.
Perraudin, Hubert A., to Equipements Automobiles Marchal. Method and device for finishing by burnishing of a helical thread cut on a cylindrical component. 4,706,483, Cl. 72-84.000.
Perry, John S., to United States of America, Army. Structural external insulation for hypersonic missiles. 4,706,912, Cl. 244-158.00A.
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Meyer, Horst; Franckowiak, Gerhard; Rosentreter, Ulrich; Gross, Rainer; Thomas, Gunter; Schramm, Matthias; Kayser, Michael; Seuter, Friedel; Perzborn, Elisabeth; and Bechem, Martin, 4,707,479, Cl. 514-222.000.
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Peters, Lloyd D. Signaling mailbox. 4,706,880, Cl. 232-35.000.
Petersen, Thomas D. Patellar clamp. 4,706,660, Cl. 128-92.0VW.
Petrella, Robert G.; and Scarpati, Michael, to Air Products and Chemicals, Inc. Polyurethane foam catalysts that eliminate polyurea-containing polyol based masterbatch cure drift. 4,707,501, Cl. 521-115.000.
Petrilli, Peter J., to Mako Marine, Inc. Boat console system. 4,706,810, Cl. 206-320.000.
Petroleo Brasileiro SA-Petrobras: *See—*
Filho, Jorge H.; and Bachmann, Dorian L., 4,707,275, Cl. 210-787.000.
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Pfeifer, Heinrich; and Schweer, Rainer, to Deutsche ITT Industries GmbH. Frequency demodulator circuit with zero-crossing counter. 4,707,666, Cl. 329-110.000.
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Pflaumer, Phillip F.: *See—*
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Pharmacia, Inc.: *See—*
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Philip Morris Incorporated: *See—*
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Phillips, Bobby M., to Eastman Kodak Company. Spinneret orifices and four-wing filament cross-sections therefrom. 4,707,409, Cl. 428-397.000.
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Gardner, Lloyd E.; and Parrott, Stephen L., 4,707,246, Cl. 208-251.00H.
Kukes, Simon G., 4,707,465, Cl. 502-219.000.
Shay, Lucas K., 4,707,449, Cl. 435-255.000.
Thorsrud, Agmund K., 4,707,402, Cl. 428-328.000.
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Pietryka, Joseph; and Cazaux, Joel, to Fives-Cail Babcock. Continuous casting machine. 4,706,733, Cl. 164-416.000.
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Plummer, Mark A., to Marathon Oil Company. Water extraction from hydrocarbons in the presence of asphaltic precipitates. 4,707,264, Cl. 210-634.000.
Plummer, William T., to Polaroid Corporation. Widely spaced fiber optic connector and multiplexer/demultiplexer using same. 4,707,063, Cl. 350-96.180.
Podobinski, David J., to Consolidation Coal Company. Method and apparatus for detecting the rate of rise of direct current. 4,707,761, Cl. 361-93.000.
Podszun, Wolfgang: *See—*
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Pohl, Ludwig; Scheuble, Bernhard; Wachtler, Andreas; Hittich, Reinhard; and Fuss, Peter, to Merck Patent Gesellschaft mit beschrankter Haftung. Bicyclooctane derivatives. 4,707,295, Cl. 252-299.620.

Poisson-Quinton, Philippe: *See—*
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McMahon, Donald H., 4,707,061, Cl. 350-96.160.
Plummer, William T., 4,707,063, Cl. 350-96.180.
Pole, Charles D., to ULS International Inc. Particulate material handling. 4,706,854, Cl. 222-459.000.
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Porschen, Jorg: *See—*
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Portas Deutschland GmbH: *See—*
Heeg, Otto, 4,707,204, Cl. 156-91.000.
Portescap: *See—*
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Portz, Heinz; and Opitz, Reinhard, to Gerhard Collardin Gesellschaft mit beschraenkter Haftung. Method for activating metal surfaces prior to zinc phosphation. 4,707,193, Cl. 148-6.15Z.
Powshok, Andrew T.: *See—*
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PPG Industries, Inc.: *See—*
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Heithoff, Robert B.; and Groetzinger, John K., 4,707,175, Cl. 65-27.000.
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Prach, Thomas F.: *See—*
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Prairie, Robert S.; and Paskowski, Frank J., Jr., to Combustion Engineering, Inc. Retrofitable coiled spring system. 4,706,900, Cl. 241-121.000.
Pratt, Howard L.; and Selzer, Robert J., to Navistar International Transportation Corp. Ambient air modulator for engine fluid heat exchanger. 4,706,461, Cl. 60-599.000.
Precision Automation Co., Inc.: *See—*
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Precision Handling Devices, Inc.: *See—*
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Precision Image Corporation: *See—*
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President and Fellows of Harvard College: *See—*
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Press, Jeffery B.; and Russell, Ronald K., to Ortho Pharmaceutical Corporation. N-(substituted thienyl)-N'-(substituted piperazinyl)-ureas. 4,707,550, Cl. 544-379.000.
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Price, Robert B.: *See—*
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Priesemuth, Wolfgang. Arrangement of work locations. 4,706,572, Cl. 108-60.000.
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Promat Industrie: *See—*
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Pruett, Wayne P.; Wang, Richard H. S.; Hilbert, Samuel D.; and Weaver, Max A., to Eastman Kodak Company. UV-absorbing condensation polymeric compositions and products therefrom. 4,707,537, Cl. 528-288.000.
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Q-Dot Corporation: *See—*
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R. Alkan & Cie: *See—*
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Ramachandran, Pallassana N.; and Barone, Patrizia, to Colgate Palmolive Company. Alpha-sulfo-fatty acid ester and/or amide salt(s) detergent laundry bars and processes for manufacture thereof. 4,707,289, Cl. 252-135.000.
Rambosek, George M., to Minnesota Mining and Manufacturing Company. Bicomponent ceramic fibers. 4,707,399, Cl. 428-225.000.
Ramirez, Pedro, to Polydyne Industries, Inc. Flexible ring seal with insert in circumferentially extending channel. 4,706,970, Cl. 277-205.000.
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Rath, Heinrich-Bernhard; and Holz, Dietrich, to Lucas Industries public limited company. Automatic adjusting device for a brake. 4,706,783, Cl. 188-79.50B.
Ratliff, George D., Jr., to USX Engineers & Consultants, Inc. Method of stripping an ingot from a sectional ingot mold and an improved sectional ingot mold therefor. 4,706,925, Cl. 249-162.000.
Rault, Michel; and Heno, Claude. High speed automatic test apparatus especially for electronic directory terminals. 4,707,849, Cl. 379-28.000.
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Rawlinson, Stephen J.: *See—*
Lee, Hsiao-Peng S.; Rawlinson, Stephen J.; and Si, Stephen S. C., 4,707,783, Cl. 364-200.000.
Raychem Limited: *See—*
Park, George B.; and Barker, David J., 4,707,388, Cl. 428-36.000.
Titcombe, Ian R. A.; and Strange, Ian A., 4,707,566, Cl. 174-78.000.
Raymond, Gary E. Cassette assembly, for use with, and in combination with, a rolled sheet materials dispenser. 4,706,904, Cl. 242-55.530.
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Kocher, Robert C., 4,707,073, Cl. 350-96.230.
Montrone, Dale L.; and Lewis, Edward T., 4,707,800, Cl. 364-788.000.
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Bismarck, Otto H., 4,707,623, Cl. 307-475.000.

Chambers, Robert W., 4,706,796, Cl. 198-345.000.
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Truskalo, Walter, 4,707,639, Cl. 315-382.000.
Read, Donald L. Releasable lock mechanism. 4,707,003, Cl. 292-45.000.
Reed, Charlie C. Electrical connector. 4,707,043, Cl. 439-142.000.
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Regula, Stanley J. Golf spike holder. 4,706,394, Cl. 36-67.00D.
Reil, Wilhelm, to Tetra Pak Developpement S.A. Package for flowable filling materials having a re-closable opening. 4,706,874, Cl. 222-526.000.
Reinaud, Guy F., to Imperial Chemical Industries plc. Vehicle guidance system particularly for use in agriculture. 4,706,773, Cl. 180-169.000.
Reinhart, Mark R.: *See*—
Anderson, Wayne H.; Larson, David E.; and Reinhart, Mark R., 4,707,750, Cl. 360-60.000.
Reise, Terrence F.: *See*—
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Moro, Dominik J.; Reisinger, Robert R.; Larson, James M.; and Kuhn, Roscoe E., 4,706,570, Cl. 105-163.200.
Remaks, William J., to Weyerhaeuser Company. Drain fitment for bulk containers. 4,706,850, Cl. 222-105.000.
Rembaum, Alan: *See*—
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Remp, Thomas: *See*—
Remp, Thomas E., Jr.; Dreyfuss, Wilfried; and Muller, Kurt, 4,706,822, Cl. 211-59.400.
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McMurtry, David R., 4,706,371, Cl. 29-568.000.
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Guetersloh, Timothy L., 4,706,808, Cl. 206-305.000.
Reule, Alfred; and Schroder, Joachim, to Carl-Zeiss-Stiftung. Current supply for radiation sources of frequency-proportional optical sensors. 4,707,838, Cl. 372-38.000.
Reutler, Herbert; and Ullrich, Manfred, to Interatom GmbH. Container system for a high-temperature nuclear reactor. 4,707,327, Cl. 376-294.000.
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Covarrubias, David S.; Yassan, Reza M.; Covarrubias, Maria S.; and Revuelta, Arturo, 4,706,973, Cl. 279-1.0SJ.
Revuelta, Jose: *See*—
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Reynolds, Randall H. Sail system with adjustable sail area. 4,706,591, Cl. 114-103.000.
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Wallow, Peter; and Bisping, Bernhard, 4,706,569, Cl. 102-518.000.
Winkler, Gert; and Zielinksi, Erich, 4,706,543, Cl. 89-38.000.
Zielinski, Erich; and Heckenbach, Theo, 4,706,544, Cl. 89-46.000.
RHOVYL: *See*—
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Rich, Lawrence D., to Riverside International, Inc. Automotive roof spoiler having retractable, concealable lamps. 4,707,014, Cl. 296-1.00S.
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Richey, Daniel D.: *See*—
Ogle, Douglas R.; Richey, Daniel D.; and Whitehurst, James L., 4,707,616, Cl. 290-48.000.
Richmond, James C., to Thermo Electric Instruments. Temperature sensing device. 4,707,148, Cl. 374-208.000.
Rickert, Robert G.: *See*—
Cupwell, Robert J.; Kaschak, Ronald A.; McBride, Donald G.; Rickert, Robert G.; and Seraphim, Donald P., 4,707,377, Cl. 427-8.000.
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Ricoh Company, Ltd.: *See*—
Aoki, Minoru, 4,707,114, Cl. 355-14.00D.
Ide, Yukio; Ohnuma, Teruyuki; and Kageyama, Yoshiyuki, 4,707,570, Cl. 178-18.000.
Ohshima, Kiyoshi; Suzuki, Shigeru; Mashiko, Harumitsu; and Ohdake, Eisyu, 4,707,126, Cl. 355-14.0SH.
Sakano, Yukio, 4,707,745, Cl. 358-283.000.
Tajima, Shoji; Kadomatsu, Yasuo; Miyazaki, Yoshio; Sakurai, Michikazu; and Anze, Kimio, 4,707,382, Cl. 427-58.000.
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Umehara, Masakira, 4,707,431, Cl. 430-271.000.
Yamada, Kunihiro, 4,707,828, Cl. 370-85.000.
Ricoh Electronics, Inc.: *See*—
Shibata, Tomoo, 4,707,211, Cl. 156-354.000.
Rider, Preston L.: *See*—
Trepus, George E., Jr.; Matin, Barry D.; and Rider, Preston L., 4,707,206, Cl. 156-187.000.
Riebel, Ulrich, to Loffler, Friedrich. Method of and an apparatus for ultrasonic measuring of the solids concentration and particle size distribution in a suspension. 4,706,509, Cl. 73-865.500.
Riedl, Reinhold, to Haacon Hebetechnik GmbH. Manual crank assembly for winches, especially for rack and pinion jacks of a lifting and depositing device for portable box-like articles, e.g. large containers. 4,706,936, Cl. 254-89.00R.
Riemenschneider, Paul K., to Highlight Industries, Inc. Stretch film wrapping device. 4,706,442, Cl. 53-556.000.
Rijksuniversiteit Utrecht: *See*—
Schuiling, Roelof D., 4,707,348, Cl. 423-554.000.
Rijnders, Willem, to Hunter Douglas International N.V. Suspended ceiling assembly. 4,706,433, Cl. 52-473.000.
Riverside International, Inc.: *See*—
Rich, Lawrence D., 4,707,014, Cl. 296-1.00S.
Rizzi, George P.: *See*—
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Roark, David N.; Nugent, Adam, Jr.; and Bandlish, Baldev K., to Ethyl Corporation. Fluid loss control in well cement slurries. 4,706,755, Cl. 166-295.000.
Robba, Max-Fernand: *See*—
Arrang, Jean-Michel; Garbarg, Monique; Lancelot, Jean-Charles; Lecomte, Jeanne-Marie; Robba, Max-Fernand; and Schwartz, Jean-Charles, 4,707,487, Cl. 514-326.000.
Robbins, Edward S., Jr., to Centaur Fencing Systems, Inc. Paddock fence layout with concrete footings. 4,706,942, Cl. 256-35.000.
Robert Bosch GmbH: *See*—
Hafele, Walter; and Guntert, Josef, 4,706,626, Cl. 123-364.000.
Roberts, Bruce A.: *See*—
Haynes, Louis V.; Pflaumer, Phillip F.; Rizzi, George P.; and Roberts, Bruce A., 4,707,365, Cl. 426-94.000.
Roberts, Joseph B.: *See*—
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Horton, Harold E.; and Roberts, Joseph B., 4,707,851, Cl. 379-29.000.
Roberts, Thomas G.; Conrad, Raymond W.; and Honeycutt, Thomas E., to United States of America, Army. Apparatus for plasma diagnostics. 4,707,133, Cl. 356-320.000.
Robertshaw Controls Company: *See*—
Kelly, Samuel T., 4,706,704, Cl. 137-489.500.
Rockenfeller, Gottfried; Rockenfeller, Wolfgang; and Kunze, Friedheim, to Rockenfeller KG Befestigungselemente. Clamping device for a traction member, particularly for a rope, cable belt, cord or the like. 4,706,345, Cl. 24-135.00L.
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Rockenfeller, Gottfried; Rockenfeller, Wolfgang; and Kunze, Friedheim, 4,706,345, Cl. 24-135.00L.
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Roos, Rudolf; Schlapp, Albert; and Federmann, Dieter, 4,707,022, Cl. 296-222.000.
Rockwell International Corporation: *See*—
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Jencek, Premyal, 4,706,886, Cl. 239-265.330.
McKiel, Frank A., Jr., 4,707,579, Cl. 219-56.220.
Schuler, Frederick T.; and Flores, Randolph, 4,707,225, Cl. 204-9.000.
Southwell, William H., 4,707,611, Cl. 250-560.000.
Swain, David M.; and Tansey, Richard J., 4,707,135, Cl. 356-347.000.
Vowell, Kennison L., 4,707,323, Cl. 376-203.000.
Rockwell, Marshall A., III. Hand held scanning input device and system. 4,707,747, Cl. 358-294.000.
Roder GmbH Sitzmobelwerke: *See*—
Korn, Heinrich, 4,707,029, Cl. 297-300.000.
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Gudymov, Ernest; Fedotov, Vasilij; Semenov, Vladimir; Rodinov, Boris; Berger, Friedrich; Wenzel, Winfried; Peise, Helmut; and Schingnitz, Manfred, 4,707,163, Cl. 48-73.000.
Rogers, Lloyd W.: *See*—
Horvath, Zoltan L.; Kavanagh, Gary A.; Manning, Steven F.; Pyszel, Ronald J.; Rogers, Lloyd W.; and Schlaps, Edgar H., 4,707,027, Cl. 297-284.000.
Rogers, Walter C., Jr., to Parma Corporation. Rocker recliner. 4,707,025, Cl. 297-259.000.
Rogers, Wayne W., to Alcon Instrumentation, Inc. Linear suction control system. 4,706,687, Cl. 128-752.000.
Rohm GmbH: *See*—
Vetter, Heinz, 4,707,393, Cl. 428-178.000.
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Patterson, Dennis R., 4,707,181, Cl. 71-92.000.
Rohr, Gustav; and Vetter, Karl-Heinz, to Frankl & Kirchner GmbH. Rotary speed ratio control for a multiple rotary drive system for a textile-working machine. 4,707,643, Cl. 318-77.000.
Rohr Industries, Inc.: *See*—
Norris, Brian, 4,706,872, Cl. 228-194.000.
Roman, Gianfranco; and Borasso, Romeo, to Claber, S.p.A. Three-arm hub joint for tubular structures specifically for hose racks and hose carts. 4,706,906, Cl. 242-86.000.

Romani, R. Marlene, to M.D.C. Romani, Inc. Dual mode hair vacuum and dryer unit. 4,706,326, Cl. 15-314.000.
Romanini, Daniele: *See*—
Forti, Sergio; Garagnani, Enea; and Romanini, Daniele, 4,707,519, Cl. 525-133.000.
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della Valle, Francesco; Romeo, Aurelio; and Lorenzi, Silvana, 4,707,469, Cl. 514-26.000.
Roncucci, Romeo: *See*—
Diaz, Joseph; Demarne, Henri; Roncucci, Romeo; and Schmelck, Paul-Henry, 4,707,541, Cl. 530-324.000.
Roos, Eberhard, to Berchtold Medizin-Elektronik GmbH & Co. Electro surgical high frequency cutting instrument. 4,706,667, Cl. 128-303.140.
Roos, Rudolf; Schlapp, Albert; and Federmann, Dieter, to Rockwell-Golde G.m.b.H. Sliding roof for an automobile. 4,707,022, Cl. 296-222.000.
Root, Steven J.; and Grigsby, James D., to Steel Heddle Manufacturing Co., Inc. Heddle frame for a high speed weaving machine. 4,706,717, Cl. 139-92.000.
Roper Corporation: *See*—
Herscher, Lee R.; and Goertzen, Gerold G., 4,706,761, Cl. 172-42.000.
Roque, Clyde D.: *See*—
Bishop, Thomas R.; Kovar, Wayne A.; and Roque, Clyde D., 4,706,745, Cl. 166-98.000.
Rorer Pharmaceutical Corporation: *See*—
Studt, William L.; Zimmerman, Harry K.; and Dodson, Stuart A., 4,707,478, Cl. 514-580.000.
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Rosen, Hans G.: *See*—
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Rosenthal, Manfred; and Roulaux, Jan, to U.S. Philips Corporation. Covering device for protecting the nozzle area of an ink jet writing head. 4,707,714, Cl. 346-140.00R.
Rosenthale, Marvin E.; Shriver, David A.; and Katz, Laurence B., to Ortho Pharmaceutical. Peptic ulcer treatment method. 4,707,495, Cl. 514-530.000.
Rosentreter, Ulrich: *See*—
Meyer, Horst; Franckowiak, Gerhard; Rosentreter, Ulrich; Gross, Rainer; Thomas, Gunter; Schramm, Matthias; Kayser, Michael; Seuter, Friedel; Perzborn, Elisabeth; and Bechem, Martin, 4,707,479, Cl. 514-222.000.
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Rossi & Catelli S.p.A.: *See*—
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Rossmoore, Harold W., to Board of Governors of Wayne State University, The. Synergistic antimicrobial or biocidal mixtures. 4,707,282, Cl. 252-11.000.
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Mohr, Glenn R.; and Roth, Donald J., 4,707,213, Cl. 156-380.200.
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Rottmaier, Ludwig: *See*—
Rasshofer, Werner; Ganster, Otto; Luckas, Brund; and Rottmaier, Ludwig, 4,707,502, Cl. 521-159.000.
Roulaux, Jan: *See*—
Rosenthal, Manfred; and Roulaux, Jan, 4,707,714, Cl. 346-140.00R.
Rousseau, Jean-Pierre. Key ring type device. 4,706,477, Cl. 70-456.00R.
Rowe, Ray. Swimming pool skimmer accelerator. 4,707,253, Cl. 210-169.000.
Rowles, Howard C.: *See*—
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Rubak, Irving L., to Treadwell Corporation. Diaphragm for electrolytic and electrochemical cells. 4,707,228, Cl. 204-128.000.
Rubin, Irving N.: *See*—
Jimenez, Ivan; and Rubin, Irving N., 4,707,772, Cl. 362-110.000.
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Nelson, David; Biddison, William; Rubin, Laurence; Greene, Warner; Leonard, Warren; and Yarchoan, Robert, 4,707,443, Cl. 435-7.000.
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Ruby, David M.: *See*—
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Ruddock, John C.: *See*—
Celmer, Walter D.; Cullen, Walter P.; Maeda, Hiroshi; Ruddock, John C.; and Tone, Junsuke, 4,707,493, Cl. 514-460.000.
Rudiger, Eckhart, to FAG Kugelfischer Georg Schafer (KGaA). Load-dependent brake pressure regulator. 4,707,037, Cl. 303-22.00R.
Ruetschle, Rudolph H.; and Macey, Keith S., to K. S. Macey Machine Company, Inc. Sheet gathering apparatus. 4,706,950, Cl. 270-54.000.
Ruhlandt, Gerald K.; and Gmurowski, Romuald, to General Motors Corporation. Bore chill for lost foam casting pattern. 4,706,732, Cl. 164-353.000.
Ruhle, Manfred; and Wincierz, Peter, to Metallgesellschaft Aktiengesellschaft. Process of producing a mechanically alloyed composite powder. 4,706,894, Cl. 241-30.000.
Ruimi, Michel: *See*—
Martinou, Robert; and Ruimi, Michel, 4,707,191, Cl. 134-3.000.
Rumsey, Roger L., to Balco, Inc. Fire-rated flush mounted corner guard. 4,706,426, Cl. 52-232.000.
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Ryall, Ronald W. Apparatus for circulating water. 4,707,308, Cl. 261-77.000.
Ryan, Charles P.; and Guenthner, Russell W., to Honeywell Bull Inc. Prioritized secondary use of a cache with simultaneous access. 4,707,784, Cl. 364-200.000.
Ryan, James W.; and Chung, Alfred, to University of Miami. Antihypertensive agents. 4,707,490, Cl. 514-423.000.
Ryan, Michael C. Device for dispensing a pet food from a sealed can container therefor. 4,706,849, Cl. 222-80.000.
S-Cal Research Corp.: *See*—
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S. T. Dupont: *See*—
Celaries, Jean E., 4,706,341, Cl. 24-11.00R.
Saab-Scania Aktiebolag: *See*—
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Sabater, Jacques; and Bauduin, Serge, to Centre Technique de l'Industrie des Papiers Cartons et Celluloses. Apparatus for measuring the state of formation of a sheet of paper. 4,707,223, Cl. 162-262.000.
Sadamitsu, Kazuo; and Makino, Yoshiyuki, to Furukawa Electric Co., Ltd. Flexible composite pipe for high-temperature fluids. 4,706,713, Cl. 138-137.000.
Sadatani, Tetsuya: *See*—
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Saffari, Akbar, to Honeywell Inc. Electrical contact assembly with composite contact construction. 4,706,383, Cl. 29-879.000.
Sage, Burton H., Jr., to Becton, Dickinson and Company. Detection of reticulocytes. 4,707,451, Cl. 436-63.000.
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Miemela, Pentti; and Jaatinen, Jarl, 4,707,603, Cl. 250-339.000.
Saint-Gobain Vitrage: *See*—
Crumbach, Richard; Gillner, Manfred; Schilde, Heinz J.; and Tiedemann, Helmut, 4,707,208, Cl. 156-285.000.
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Saintonge, Andre: *See*—
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Saito, Kenichiro; Kanaoka, Chikao; and Aoyama, Shigeyuki, to Aoki Corporation. Air sterilization filter. 4,707,167, Cl. 55-267.000.
Saito, Kikuji: *See*—
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Sakaguchi, Masahiro: *See*—
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Sakai, Yoshio; Nagai, Ryo; Yamamoto, Shuichi; Nakamura, Hideo; and Noguchi, Kouki, to Hitachi, Ltd. Read-only memory. 4,707,718, Cl. 357-45.000.
Sakakibara, Shiro: *See*—
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Sakamoto, Itaru: *See*—
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Sakane, Isamu; and Kawauchi, Satsuki, to I.S.T. Corporation. Composite rubber material and process for making same. 4,707,387, Cl. 427-393.500.
Sakano, Yukio, to Ricoh Company, Ltd. Digital copier with document image region decision device. 4,707,745, Cl. 358-283.000.
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Salday Products Corporation: *See*—
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Patrick, James W.; Heinemann, Stephen F.; Boss, Barbara D.; and Cowan, W. Maxwell, 4,707,356, Cl. 424-88.000.
Salle, Ralph D.: *See*—
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Salzgitter Industriebau GmbH: *See*—
Klose, Reinhard, 4,706,892, Cl. 241-16.000.
Sammic, S.A.: *See*—
De Zarate, Luis C. O., 4,706,559, Cl. 99-504.000.
Sampson, Ronald. Automatic closing activator. 4,706,330, Cl. 16-48.500.
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Fukushima, Eiji; Tanaka, Minoru; Sanada, Kazuo; and Chigira, Sadao, 4,707,075, Cl. 350-96.260.
Sanada, Yoshio: *See*—
Hammura, Hisao; Echizen, Tetsuro; and Sanada, Yoshio, 4,707,691, Cl. 340-754.000.
Sanchez-Caldera, Luis E.; Suh, Nam P.; Chun, Jung-Hoon; Lee, Arthur K.; and Blackall, Frederick S., IV, to Mixalloy Corporation. Mixing and casting apparatus. 4,706,730, Cl. 164-135.000.
Sanders, Sam, to JTG of Nashville, Inc. Membrane keyboard for songbook tone generator. 4,706,536, Cl. 84-1.010.
Sandoz Ltd.: *See*—
Vogel, Arnold, 4,707,482, Cl. 514-253.000.
Sankey, Brian; and Sankey, Douglas, to Senmar Corporation. Dispenser for wine. 4,706,847, Cl. 222-1.000.
Sankey, Douglas: *See*—
Sankey, Brian; and Sankey, Douglas, 4,706,847, Cl. 222-1.000.
Sanki Vinyl Kabushiki Kaisha: *See*—
Nomura, Tetsuro, 4,706,396, Cl. 40-124.200.
Sano, Takashi: *See*—
Oguni, Kensaku; Ishibane, Kyuhei; Kuroda, Shigeaki; Yasuda, Hiromu; Sano, Takashi; and Etou, Hironori, 4,706,469, Cl. 62-222.000.
Sano, Tomohiko; Fujisawa, Noriyoshi; Fukuda, Masataka; and Suganuma, Tsuyoshi, to Kao Corporation. Detergent composition. 4,707,292, Cl. 252-174.160.
Sanofi: *See*—
Cecchi, Roberto; Boigegrain, Robert; Bianchetti, Alberto; Poggesi, Elena; and Croci, Tiziano, 4,707,497, Cl. 514-647.000.
Diaz, Joseph; Demarne, Henri; Roncucci, Romeo; and Schmelck, Paul-Henry, 4,707,541, Cl. 530-324.000.
Santos, Edward: *See*—
Chun, Kil Whan; Gilbert, Allan H.; Lang, David J.; and Santos, Edward, 4,707,160, Cl. 8-101.000.
Santrade Limited: *See*—
Schachner, Herbert; Tippmann, Heinz; Lux, Benno; Stjernberg, Klas G.; and Thelin, Anders G., 4,707,384, Cl. 427-249.000.
Sanyo Electric Co., Ltd.: *See*—
Awane, Misao; Hara, Seiji; and Kobayashi, Satoshi, 4,706,794, Cl. 194-217.000.
Tanaka, Kanji; and Arai, Masashi, 4,707,856, Cl. 381-15.000.
Saroun, Pavel: *See*—
Krejcir, Oldrich; Zajic, Bohuslav; and Saroun, Pavel, 4,706,923, Cl. 248-638.000.
Sartorio, Franco, to Prima Industrie, S.p.A. Process and apparatus for precision folding of sheet metal. 4,706,491, Cl. 72-461.000.
Sasagawa, Katsuyoshi; Nishihara, Kunio; Ozawa, Hiroshi; and Imai, Masao, to Mitsui Toatsu Chemicals, Incorporated. Optical recording method and media therefor. 4,707,425, Cl. 430-21.000.
Sasagawa, Katsuyoshi: *See*—
Ozawa, Hiroshi; Hosono, Yoichi; Hirose, Sumio; Sasagawa, Katsuyoshi; and Imai, Masao, 4,707,430, Cl. 430-270.000.
Sasaki, Akira: *See*—
Kitagishi, Tomoji; Sasaki, Akira; Hakoyama, Akiyoshi; Furukawa, Shigetaka; Suzaki, Masafumi; Kobayashi, Ryoichi; Mikami, Katsumasa; Takahashi, Yoshihito; Nagano, Yousuke; and Honma, Takeo, 4,707,708, Cl. 346-76.0PH.
Sasaki, Isao: *See*—
Moriizumi, Hirokazu; Horiguchi, Akira; and Sasaki, Isao, 4,707,403, Cl. 428-328.000.
Sasaki, Kouji: *See*—
Koizumi, Junji; Sasaki, Kouji; and Naito, Junichiro, 4,707,528, Cl. 525-432.000.
Sasaki, Makoto; Yamakawa, Masaki; Hirose, Toshifumi; and Isayama, Katsuhiko, to Nippon Oil Co., Ltd.; and Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Tackifier composition. 4,707,526, Cl. 525-404.000.
Sasaki, Noboru, to Fuji Photo Film Co., Ltd. Color photographic material. 4,707,436, Cl. 430-504.000.
Sashida, Kiyoshi: *See*—
Takahashi, Fumitaka; Kimura, Yoshihiko; Tsubata, Hideo; Ohji, Nobuaki; and Sashida, Kiyoshi, 4,707,057, Cl. 350-96.120.
Sato, Katsuhiko: *See*—
Senda, Yutaka; Sato, Katsuhiko; Kozawa, Tetsuo; Nomura, Etsuzo; and Sakakibara, Yasuo, 4,706,584, Cl. 112-121.110.
Sato, Kimiaki: *See*—
Takemae, Yoshihiro; Nakano, Tomio; Nakano, Masao; and Sato, Kimiaki, 4,707,811, Cl. 365-239.000.
Sato, Takao: *See*—
Arita, Setsuo; and Sato, Takao, 4,707,621, Cl. 307-441.000.
Sato, Toshiro: *See*—
Takao, Hisoka; Sato, Toshiro; Saito, Seiichi; and Hayashi, Toshinari, 4,707,622, Cl. 307-448.000.
Sato, Yasushi: *See*—
Hara, Toshitami; Sato, Yasushi; Takatori, Yasushi; and Shirato, Yoshiaki, 4,707,705, Cl. 346-75.000.
Sato, Yoshinori; Tsuchiya, Yukio; and Fujimoto, Keiji, to Lotte Co., Ltd. Soft starchy chewing gum. 4,707,363, Cl. 426-3.000.
Satomura, Masato, to Fuji Photo Film Co., Ltd. Indole derivatives and process for producing the same. 4,707,553, Cl. 546-273.000.
Satomura, Masato: *See*—
Takashima, Masanobu; Satomura, Masato; Iwakura, Ken; and Igarashi, Akira, 4,707,464, Cl. 503-216.000.
Saugeon, Ulrich: *See*—
Moeller, Reiner; Hetzel, Gert; Saugeon, Ulrich; Boheim, Gustav; and Zurinski, Viktor, 4,707,813, Cl. 367-103.000.
Saunders, Richard J.: *See*—
Bennett, Donald; and Saunders, Richard J., 4,707,837, Cl. 372-34.000.
Savit, Carl H.; Boone, Rhonda; and Doyle, Mark, to Western Geophysical Company of America. Beam-activated complex-solid formation utilizing pattern-independent, coordinate-sequence construction. 4,707,787, Cl. 364-420.000.
Savoy Leather Manufacturing Corporation: *See*—
Savoy, Robert L., 4,707,247, Cl. 206-387.000.
Savoy, Robert L., to Savoy Leather Manufacturing Corporation. Disk cassette storing. 4,707,247, Cl. 206-387.000.
Sawafuji Electric Co., Ltd.: *See*—
Akazawa, Naoki; Nishi, Kazuhiko; Kawakami, Naoya; Fujisawa, Yoshiaki; and Yamada, Noriyoshi, 4,706,470, Cl. 62-209.000.
Sawai, Toshitsugu: *See*—
Nakao, Tadashi; and Sawai, Toshitsugu, 4,707,600, Cl. 250-227.000.
Sawaki, Akira; and Kasahara, Seitaro, to Konishiroku Photo Industry Co., Ltd. Copying apparatus. 4,707,121, Cl. 355-40.000.
Sawamura, Mitsuharu, to Canon Kabushiki Kaisha. Optical film and process for producing same. 4,707,820, Cl. 369-284.000.
Sayles, David C., to United States of America, Army. Non nitroglycerin-containing composite-modified double-base propellant. 4,707,199, Cl. 149-19.200.
Scadding, John R., to Ford Motor Company. Engine cooling system. 4,706,615, Cl. 123-41.010.
Scaduto, Anthony F.: *See*—
Giammarco, Nicholas J.; Gimpelson, Alexander; Kaplita, George A.; Lopata, Alexander D.; Scaduto, Anthony F.; and Shepard, Joseph F., 4,707,218, Cl. 156-643.000.
Scarlata, Richard F., to Xerox Corporation. Sheet binding cartridge. 4,707,215, Cl. 156-578.000.
Scarpati, Michael: *See*—
Petrella, Robert G.; and Scarpati, Michael, 4,707,501, Cl. 521-115.000.
Schaar, John. Arrow and components thereof. 4,706,965, Cl. 273-416.000.
Schachner, Herbert; Tippmann, Heinz; Lux, Benno; Stjernberg, Klas G.; and Thelin, Anders G., to Santrade Limited. Method for making a composite body coated with one or more layers of inorganic materials including CVD diamond. 4,707,384, Cl. 427-249.000.
Schaefer, Ted F.: *See*—
Friedman, Arthur; Lehman, E. Dale; McAleer, William J.; Schaefer, Ted F.; Scolnick, Edward M.; and Wampler, D. Eugene, 4,707,542, Cl. 530-371.000.
Schafer, Walter; Muller, Hanns P.; Kuchenmeister, Rolf; and Sickert, Armin, to Bayer Aktiengesellschaft. Process for the production of sheet structures. 4,707,386, Cl. 427-386.000.
Scharer, Bernhard, to Sulzer Brothers Limited. Mounting arrangement for a switching unit for a loom. 4,706,714, Cl. 139-1.00R.
Schauder, Colin D., to Westinghouse Electric Corp. Voltage-controlled field-oriented induction motor control system. 4,707,651, Cl. 318-800.000.

Scheuble, Bernhard: *See*—
Pohl, Ludwig; Scheuble, Bernhard; Wachtler, Andreas; Hittich, Reinhard; and Fuss, Peter, 4,707,295, Cl. 252-299.620.
Schiek, Oswald. Optical arrangement for photometrical analysis measuring devices. 4,707,131, Cl. 356-73.000.
Schiel, Christian: *See*—
Mullner, Josef; Schiel, Christian; and Steiner, Karl, 4,707,222, Cl. 162-205.000.
Schilde, Heinz J.: *See*—
Crumbach, Richard; Gillner, Manfred; Schilde, Heinz J.; and Tiedemann, Helmut, 4,707,208, Cl. 156-285.000.
Schill, Herbert: *See*—
Brantl, Victor; Bomann, Werner; and Schill, Herbert, 4,707,475, Cl. 514-215.000.
Schilling, Walter W.: *See*—
Churchland, Mark T.; and Schilling, Walter W., 4,706,799, Cl. 198-457.000.
Schingnitz, Manfred: *See*—
Gudymov, Ernest; Fedotov, Vasilij; Semenov, Vladimir; Rodinov, Boris; Berger, Friedrich; Wenzel, Winfried; Peise, Helmut; and Schingnitz, Manfred, 4,707,163, Cl. 48-73.000.
Schirmann, Peter J.: *See*—
Gatechair, Leslie R.; Blumenstein, Gary M.; and Schirmann, Peter J., 4,707,432, Cl. 430-281.000.
Schirmer, Alfred F. Seal ring for piston rods with partings. 4,706,971, Cl. 277-215.000.
Schlafer, Ludwig: *See*—
Meininger, Fritz; and Schlafer, Ludwig, 4,707,545, Cl. 534-588.000.
Schlapp, Albert: *See*—
Roos, Rudolf; Schlapp, Albert; and Federmann, Dieter, 4,707,022, Cl. 296-222.000.
Schlaps, Edgar H.: *See*—
Horvath, Zoltan L.; Kavanagh, Gary A.; Manning, Steven F.; Pyszel, Ronald J.; Rogers, Lloyd W.; and Schlaps, Edgar H., 4,707,027, Cl. 297-284.000.
Schlegel, Hans-Joachim. Device for perforating the lens capsule front wall in the eye of living beings. 4,706,669, Cl. 128-329.00R.
Schlegel, Wolfgang: *See*—
Panse, Hubert; and Schlegel, Wolfgang, 4,707,775, Cl. 363-37.000.
Schlosser, Philip A.: *See*—
Kable, Robert G.; and Schlosser, Philip A., 4,707,572, Cl. 178-18.000.
Schlueter, Francis E.: *See*—
Meyer, Vernis H.; and Schlueter, Francis E., 4,706,710, Cl. 137-625.470.
Schmelck, Paul-Henry: *See*—
Diaz, Joseph; Demarne, Henri; Roncucci, Romeo; and Schmelck, Paul-Henry, 4,707,541, Cl. 530-324.000.
Schmid, Hermann; Sjoberg, Per; and Svensson, Leif, to Nobel Kemi AB. Explosive charges. 4,706,567, Cl. 102-318.000.
Schmidt, Albert L.; Sherwin, Gary W.; Blackham, Kenneth K.; and Johnson, John L., to Westinghouse Electric Corp. Disposable monitor for an EEG head set. 4,706,679, Cl. 128-639.000.
Schmidt, Roger N.: *See*—
Miller, John W.; Mittelmark, Melvin F.; and Schmidt, Roger N., 4,707,644, Cl. 318-136.000.
Schmidt, Vinzenz, to Ford Motor Company. Gear selector for manual transmission having reverse gear lockout. 4,706,514, Cl. 74-476.000.
Schmidt, Walter R., to Karl Eybl Gesellschaft m.b.H. Process of manufacturing a knitted pile fabric. 4,706,474, Cl. 66-9.00B.
Schmiedberg, Winfried: *See*—
Dittmar, Robert W.; and Schmiedberg, Winfried, 4,706,484, Cl. 72-225.000.
Schmitz, Heinz: *See*—
Wank, Joachim; Waldenrath, Werner; Schmitz, Heinz; and Pakulat, Gunter, 4,707,396, Cl. 428-216.000.
Schneider, Alan A.; Stewart, David A.; Jolson, Joseph D.; Auel, RaeAnn M.; and Price, John F., to Mine Safety Appliances Company. Electrochemical cell for the detection of noxious gases. 4,707,242, Cl. 204-412.000.
Schneider, Alfred; and Eberhard, Joachim, to BASF Aktiengesellschaft. Cuboid container for articles and hinge and pivot-limiting means therefor. 4,706,813, Cl. 206-387.000.
Schneider, David E., to Weatherford U.S., Inc. Cementing plug. 4,706,747, Cl. 166-153.000.
Schneider, Imogene: *See*—
Dame, John B.; Williams, Jackie L.; McCutchan, Thomas F.; and Schneider, Imogene, 4,707,357, Cl. 424-88.000.
Schnell, William J.: *See*—
Fentress, Philip W.; Kenley, Rodney S.; and Schnell, William J., 4,707,335, Cl. 422-44.000.
Schnurer, David M.; and Schnurer, Ellen R. Diaper dispensing and disposal unit. 4,706,845, Cl. 221-102.000.
Schnurer, Ellen R.: *See*—
Schnurer, David M.; and Schnurer, Ellen R., 4,706,845, Cl. 221-102.000.
Schock, Hans-Werner: *See*—
Hewig, Gert; Schurich, Bernd; Worner, Jorg; and Schock, Hans-Werner, 4,707,561, Cl. 136-256.000.
Schoengen, Anton: *See*—
Donhauser, Friedrich; Schoengen, Anton; Schroeder, Johann H.; and Porschen, Jorg, 4,707,274, Cl. 210-774.000.
Schofield, Paul S. Enclosure. 4,706,551, Cl. 98-1.000.
Schon, Georg: *See*—
Batzill, Wolfgang; Dobbelstein, Arnold; Geist, Michael; Schon, Georg; and Ott, Gunther, 4,707,232, Cl. 204-181.700.
Schonfeld, Joachim; Lapp, Hans-Gunter; and Greiner, Gabriele, to Lindemann Maschinenfabrik GmbH. Crushing machine with a removable outlet grate. 4,706,898, Cl. 241-73.000.
Schrader, Margarete, to Frankonia Kindersausstattungen GmbH & Co. KG. Safety seat for the conveyance of babies and very small children in vehicles. 4,707,024, Cl. 297-250.000.
Schram, Harlan L.; and O'Neil, Gerald L., to Wolverine World Wide, Inc. Hog splitter. 4,706,335, Cl. 17-23.000.
Schramm, Matthias: *See*—
Meyer, Horst; Franckowiak, Gerhard; Rosentreter, Ulrich; Gross, Rainer; Thomas, Gunter; Schramm, Matthias; Kayser, Michael; Seuter, Friedel; Perzborn, Elisabeth; and Bechem, Martin, 4,707,479, Cl. 514-222.000.
Schreiber, Karl R.; and Harwood, Brian K., to Andrew Corporation. Tool for cutting coaxial cable. 4,706,384, Cl. 30-91.200.
Schroder, Joachim: *See*—
Reule, Alfred; and Schroder, Joachim, 4,707,838, Cl. 372-38.000.
Schroeder, Johann H.: *See*—
Donhauser, Friedrich; Schoengen, Anton; Schroeder, Johann H.; and Porschen, Jorg, 4,707,274, Cl. 210-774.000.
Schuiling, Roelof D., to Rijksuniversiteit Utrecht. Method for neutralizing waste sulfuric acid by adding a silicate. 4,707,348, Cl. 423-554.000.
Schuler, Frederick T.; and Flores, Randolph, to Rockwell International Corporation. Fluid-cooled channel construction. 4,707,225, Cl. 204-9.000.
Schulten, Rudolf: *See*—
Iniotakis, Nicolaos; von der Decken, Claus-Benedict; Hecker, Rudolf; Frohling, Werner; and Schulten, Rudolf, 4,707,342, Cl. 423-248.000.
Schultz, William J., to Minnesota Mining and Manufacturing Company. Glycidylethers of fluorene-containing bisphenols. 4,707,534, Cl. 528-97.000.
Schulz-Hennig, Joerg; and Sievers, Horst, to Ing. Rudolf Hell GmbH. Method and apparatus for acoustic supervision of adjustment operations at optical devices. 4,707,597, Cl. 250-209.000.
Schulz, Werner, to James River-Norwalk, Inc. Disposable cup with sidewall pop-out. 4,706,873, Cl. 229-1.50B.
Schulze, Rainer: *See*—
Conrad, Horst; Tobergte, Konrad; and Schulze, Rainer, 4,707,563, Cl. 174-50.000.
Schulze, Wolfram: *See*—
Vogt, Siegfried; and Schulze, Wolfram, 4,706,586, Cl. 112-121.290.
Schurich, Bernd: *See*—
Hewig, Gert; Schurich, Bernd; Worner, Jorg; and Schock, Hans-Werner, 4,707,561, Cl. 136-256.000.
Schurter, Rolf; and Pissiotas, Georg, to Ciba-Geigy Corporation. Sulfonylureas. 4,707,177, Cl. 71-90.000.
Schurter, Rolf: *See*—
Bohner, Beat; Fory, Werner; Schurter, Rolf; and Pissiotas, Georg, 4,707,551, Cl. 544-408.000.
Schuurmans, Marinus E., to USM Corporation. Making belt loops and attaching them to articles of clothing. 4,706,585, Cl. 112-121.270.
Schwartz, Jean-Charles: *See*—
Arrang, Jean-Michel; Garbarg, Monique; Lancelot, Jean-Charles; Lecomte, Jeanne-Marie; Robba, Max-Fernand; and Schwartz, Jean-Charles, 4,707,487, Cl. 514-326.000.
Schwarze, Klaus: *See*—
Besche, Anton; Osterling, Jost; and Schwarze, Klaus, 4,707,203, Cl. 156-85.000.
Schweer, Rainer: *See*—
Pfeifer, Heinrich; and Schweer, Rainer, 4,707,666, Cl. 329-110.000.
Schwemmer, Leonard J.: *See*—
Thorn, Richard P.; and Schwemmer, Leonard J., 4,706,946, Cl. 267-292.000.
Schwindeman, James A., to PPG Industries, Inc. Herbicidally active isoxazolyl-imidazolidinone derivatives. 4,707,180, Cl. 71-92.000.
SCM Metal Products, Inc.: *See*—
Hashiguchi, Don H.; and Klar, Erhard, 4,707,184, Cl. 75-228.000.
Scolnick, Edward M.: *See*—
Friedman, Arthur; Lehman, E. Dale; McAleer, William J.; Schaefer, Ted F.; Scolnick, Edward M.; and Wampler, D. Eugene, 4,707,542, Cl. 530-371.000.
Screen, Stafford T., to Colson Castors (U.K.). Twin-wheel castor. 4,706,329, Cl. 16-47.000.
Scriptel Corporation: *See*—
Kable, Robert G.; and Schlosser, Philip A., 4,707,572, Cl. 178-18.000.
Scullion, Martin: *See*—
Lubotta, Mark S.; and Scullion, Martin, 4,706,878, Cl. 229-73.000.
Seal-Tech, Inc.: *See*—
Johnson, Frederick W., 4,707,001, Cl. 285-332.300.
Searl, Stephen, to General Electric Company. Ice piece ejection mechanism for icemaker. 4,706,465, Cl. 62-137.000.
Sebalj, Renata: *See*—
Gessinger, Gernot; Sebalj, Renata; and Widl, Wolfgang, 4,707,576, Cl. 200-146.00R.
Segawa, Takashi; and Tsuboi, Kunio, to Sony Corporation. Method for forming articles by injection molding. 4,707,321, Cl. 264-294.000.
Seibert, Bernd: *See*—
Haberland, Detlef; Langenwalter, Michael; Panzer, Klaus; Rosen, Hans G.; Spaeter, Lothar; Spaeth, Werner; Seibert, Bernd; and Haltenorth, Helmut, 4,707,067, Cl. 350-96.200.
Seidl, Thomas L.: *See*—
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Seiko Epson Kabushiki Kaisha: *See*—
Arai, Kenichiro, 4,707,154, Cl. 400-185.000.
Seikosha Co., Ltd.: *See*—
Hanya, Masao, 4,707,143, Cl. 368-165.000.
Mukoyama, Masumi, 4,707,144, Cl. 368-165.000.
Seiter, Wolfgang; and Koch, Otto, to Henkel Kommanditgesellschaft auf Aktien. Granular adsorbent. 4,707,290, Cl. 252-140.000.
Sekine, Mikiya: *See*—
Morishita, Sadao; Matsushita, Toshihiko; and Sekine, Mikiya, 4,707,404, Cl. 428-335.000.
Seljelid, Rolf: *See*—
Larm, Olle; and Seljelid, Rolf, 4,707,471, Cl. 514-54.000.
Selzer, Robert J.: *See*—
Pratt, Howard L.; and Selzer, Robert J., 4,706,461, Cl. 60-599.000.
Semenov, Vladimir: *See*—
Gudymov, Ernest; Fedotov, Vasilij; Semenov, Vladimir; Rodinov, Boris; Berger, Friedrich; Wenzel, Winfried; Peise, Helmut; and Schingnitz, Manfred, 4,707,163, Cl. 48-73.000.
Semiconductor Energy Laboratory Co., Ltd.: *See*—
Yamazaki, Shumpei; and Nagayama, Susumu, 4,706,376, Cl. 437-4.000.
Senda, Yutaka; Sato, Katsuhiko; Kozawa, Tetsuo; Nomura, Etsuzo; and Sakakibara, Yasuo, to Brother Kogyo Kabushiki Kaisha. Control unit for providing seam length control of a sewing machine. 4,706,584, Cl. 112-121.110.
Senju Pharmaceutical Co., Ltd.: *See*—
Ando, Tetsuya, 4,707,343, Cl. 422-300.000.
Senmar Corporation: *See*—
Sankey, Brian; and Sankey, Douglas, 4,706,847, Cl. 222-1.000.
Seno, Makito; Misawa, Yoshihiko; Maeda, Yoshinobu; and Fukumoto, Kengi, to Matsushita Electric Industrial Co., Ltd. Parts mounting apparatus. 4,706,379, Cl. 29-740.000.
Seo, Yosuke: *See*—
Ohta, Norio; Okamine, Shigenori; Sugita, Yutaka; Seo, Yosuke; and Tamura, Takashi, 4,707,755, Cl. 360-114.000.
Seraphim, Donald P.: *See*—
Capwell, Robert J.; Kaschak, Ronald A.; McBride, Donald G.; Rickert, Robert G.; and Seraphim, Donald P., 4,707,377, Cl. 427-8.000.
Serizawa, Mitsuya: *See*—
Kawamoto, Yoshimichi; Furukawa, Yoshimi; Hamada, Tetsuro; and Serizawa, Mitsuya, 4,706,976, Cl. 280-91.000.
Seshadri, Jayaram: *See*—
Howland, Leland L.; and Seshadri, Jayaram, 4,706,468, Cl. 62-199.000.
Seshimoto, Osamu; and Nirasawa, Mitsuharu, to Fuji Photo Film Co., Ltd. Ion selective electrode. 4,707,243, Cl. 204-418.000.
Sesona, Giancarlo: *See*—
Zgliczynski, Marek; and Sesona, Giancarlo, 4,706,353, Cl. 29-156.40R.
Seto, Belinda P.; Coleman, William G., Jr.; and Gerety, Robert J., to United States of America, Health and Human Services. Screening test for reverse-transcriptase containing virus such as non-A, non-B hepatitis, NANBH. 4,707,439, Cl. 435-5.000.
Setoguchi, Yoichi: *See*—
Muraoka, Kenichi; Setoguchi, Yoichi; Kawase, Tadamasa; Kawata, Hiroitsu; Komatsu, Hisamoto; and Uchida, Makoto, 4,707,376, Cl. 426-658.000.
Seubert, George A., Jr.: *See*—
Fisch, Michael H.; Hegranes, Barbara A.; and Seubert, George A., Jr., 4,707,509, Cl. 524-147.000.
Seuref A.G.: *See*—
Brasey, Pierre-Noel, 4,707,360, Cl. 424-94.100.
Seuter, Friedel: *See*—
Meyer, Horst; Franckowiak, Gerhard; Rosentreter, Ulrich; Gross, Rainer; Thomas, Gunter; Schramm, Matthias; Kayser, Michael; Seuter, Friedel; Perzborn, Elisabeth; and Bechem, Martin, 4,707,479, Cl. 514-222.000.
Sevastakis, Gus. Continuous casting of strips or bars. 4,706,734, Cl. 164-443.000.
Seybold, Werner: *See*—
Gerstner, Richard; Look, Gunter; Seybold, Werner; and Stener, Werner, 4,707,034, Cl. 301-6.00V.
Shabrang, Mani, to Dow Chemical Company, The. Device and method for fluorinating compounds. 4,707,224, Cl. 204-1.00T.
Shaffer, Robert L.: *See*—
Wallace, Joseph E.; and Shaffer, Robert L., 4,706,556, Cl. 99-330.000.
Shah, Dilip H.; and Kopp, Clinton, to Baxter Travenol Laboratories, Inc. Hollow fiber potted microfilter. 4,707,268, Cl. 210-650.000.
Shah, Dilipkumar N. Rubber-modified epoxy adhesives. 4,707,518, Cl. 525-122.000.
Shah, Divyesh P.: *See*—
Takiar, Hem P.; Shah, Divyesh P.; and Hilton, Robert E., 4,707,418, Cl. 428-675.000.
Shamie, Louis. Double action crib drop side lock and mattress support. 4,706,312, Cl. 5-93.00R.
Shannon, William H.; and Sutton, Wesley D., Jr., to Game Time, Inc. Recreational swing set seat. 4,706,952, Cl. 272-85.000.
Sharp, Gordon P.; Curtiss, William P.; and Yundt, George B., to Phoenix Controls Corp. Fume hood controller. 4,706,553, Cl. 98-115.300.
Sharp Kabushiki Kaisha: *See*—
Hashimoto, Shintaro; Masuzawa, Sigeaki; Kunita, Hisao; Inoue, Tomohiro; and Nishimura, Kosuke, 4,707,794, Cl. 364-513.500.
Nagano, Fumikazu, 4,707,706, Cl. 346-76.0PH.
Nakao, Tadashi; and Sawai, Toshitsugu, 4,707,600, Cl. 250-227.000.
Ogura, Takashi; Tanaka, Koichi; Taniguchi, Koji; Yoshida, Masaru; and Mikami, Akiyoshi, 4,707,419, Cl. 428-690.000.
Takazume, Masafumi; and Ishikawa, Kazuhiko, 4,707,588, Cl. 219-400.000.
Sharpe, Robert: *See*—
Hayes, Michael E.; Hass, Gary R.; Sharpe, Robert; Nestaas, Eirik; and Ostrovsky, Mikhail V., 4,706,749, Cl. 166-267.000.
Shaub, Harold: *See*—
Goldblatt, Irwin L.; and Shaub, Harold, 4,707,284, Cl. 252-32.70E.
Shay, Lucas K., to Phillips Petroleum Company. *Pichia pastoris* yeast strains of enhanced tryptophan content. 4,707,449, Cl. 435-255.000.
Sheets, John H. Positioning implement for intraocular lens. 4,706,666, Cl. 128-303.00R.
Shell Oil Company: *See*—
Korcz, William H.; and Singhal, Surendra N., 4,706,833, Cl. 220-67.000.
Shellhause, Ronald L., to General Motors Corporation. Drum brake adjusters. 4,706,784, Cl. 188-79.50B.
Shepard, Joseph F.: *See*—
Giammarco, Nicholas J.; Gimpelson, Alexander; Kaplita, George A.; Lopata, Alexander D.; Scaduto, Anthony F.; and Shepard, Joseph F., 4,707,218, Cl. 156-643.000.
Shepherd, Robin G., to John Wyeth & Brother Limited. Preparation of nitriles and thioamides of fused ring pyridine derivatives. 4,707,552, Cl. 546-176.000.
Sheppard, Frank P.: *See*—
Anthony, Bruce O., Jr.; Heise, Thomas M.; and Sheppard, Frank P., 4,707,803, Cl. 364-900.000.
Sherdan, Thomas L. Snail and slug electrical barrier. 4,706,941, Cl. 256-10.000.
Sherman, William, III; Larkin, Francis C.; and Horvath, Stephen J., to Brandt, Incorporated. Method and apparatus for counting sheets which may be fed in skewed and/or overlapping fashion. 4,707,599, Cl. 250-223.00R.
Sherman, William E., II, to Allied Corporation. Method of injecting molding a universal joint. 4,707,320, Cl. 264-242.000.
Sherwin, Gary W.: *See*—
Schmidt, Albert L.; Sherwin, Gary W.; Blackham, Kenneth K.; and Johnson, John L., 4,706,679, Cl. 128-639.000.
Sherwood, Carl H.: *See*—
Fornuto, Joseph; Gifford, William E.; Nolan, Daniel; and Sherwood, Carl H., 4,706,708, Cl. 137-588.000.
Sherwood, Donald G.; Gillett, James E.; and Ekeroth, Douglas E., to Westinghouse Electric Corp. Top end support for water displacement rod guides of pressurized water reactor. 4,707,331, Cl. 376-463.000.
Sherwood Medical Company: *See*—
Dodge, Larry H.; and Stone, Glen, 4,707,276, Cl. 210-789.000.
Shiba, Haruo; and Sakata, Yoshiya, to TDK Corporation. Pressing spring for a magnetic tape cartridge. 4,707,757, Cl. 360-132.000.
Shibata, Tomoo, to Ricoh Electronics, Inc. Linerless thermal label printer and applicator. 4,707,211, Cl. 156-354.000.
Shichijo, Shunichi: *See*—
Shinyagaito, Tatsuya; Kuramoto, Terumasa; Machida, Toyotaka; Saito, Kikuji; Shichijo, Shunichi; Yamagishi, Tooru; Ishii, Kazuyoshi; Kobayashi, Yoshinao; and Hirata, Atsumi, 4,707,733, Cl. 358-342.000.
Shicoh Engineering Co., Ltd.: *See*—
Miyao, Osami; Shiraki, Manabu; and Ohsaka, Masayuki, 4,707,645, Cl. 318-254.000.
Shiffler, Donald A.: *See*—
Clark, John T.; and Shiffler, Donald A., 4,707,407, Cl. 428-361.000.
Shimamura, Yoshinori, to Canon Kabushiki Kaisha. Exposure apparatus and method. 4,707,609, Cl. 250-492.100.
Shimizu Construction Co., Ltd.: *See*—
Sugita, Minoru; Nakatsuji, Teruyuki; Fujisaki, Tadashi; Hiraga, Hisao; Nishimoto, Takashi; and Futagawa, Minoru, 4,706,430, Cl. 52-309.160.
Shimizu, Masahiro: *See*—
Okamoto, Tatsuo; Shimizu, Masahiro; and Tsukamoto, Katsuhiro, 4,707,723, Cl. 357-67.000.
Shimomura, Setsuhiro: *See*—
Nishikawa, Toshihide; Hanada, Kenichirou; Nishimura, Yukinobu; and Shimomura, Setsuhiro, 4,706,634, Cl. 123-492.000.
Shin-Etsu Chemical Co., Ltd.: *See*—
Itoh, Kunio; Okada, Fumio; Yamamoto, Yasushi; and Aoki, Hisashi, 4,707,503, Cl. 522-99.000.
Shin-Kobe Electric Machinery Co. Ltd.: *See*—
Hammura, Hisao; Echizen, Tetsuro; and Sanada, Yoshio, 4,707,691, Cl. 340-754.000.
Shinada, Hidetoshi, to Thomson-CSF. Method of detecting a drift amount in two-dimensionally scanning a form slide film and a detecting apparatus. 4,707,710, Cl. 346-108.000.
Shinbrot, Troy; and Kuo, Youti, to Xerox Corporation. Document feeder for moving platen copiers. 4,707,113, Cl. 355-14.0SH.
Shinko Electric Co., Ltd.: *See*—
Toida, Akikazu; Iwata, Satoshi; Takahashi, Fumio; and Mimura, Takanobu, 4,707,703, Cl. 346-1.100.
Shinozaki, Mamoru: *See*—
Ohkochi, Katsutoshi; Shinozaki, Mamoru; Ohshita, Toshiyuki; Kitano, Masayasu; and Kamata, Seizo, 4,706,753, Cl. 166-286.000.
Shinyagaito, Tatsuya; Kuramoto, Terumasa; Machida, Toyotaka; Saito, Kikuji; Shichijo, Shunichi; Yamagishi, Tooru; Ishii, Kazuyoshi; Kobayashi, Yoshinao; and Hirata, Atsumi, to Victor Company of Japan, Ltd. Information signal recording disc comprising a connected

region formed between parallel program recorded and single program recorded regions, and reproducing apparatus therefor. 4,707,733, Cl. 358-342.000.

Shiomi, Kengo, to Tokyo Juki Industrial Co., Ltd. Presser foot lifter in sewing machine. 4,706,587, Cl. 112-237.000.

Shirahata, Akihiko, to Toray Silicone Co., Ltd. Method for producing organosilicon polymers and the polymers prepared thereby. 4,707,531, Cl. 528-12.000.

Shirai, Koji; and Kawamura, Ken, to Kabushiki Kaisha Toshiba. Semiconductor memory device. 4,707,720, Cl. 357-53.000.

Shiraimatsu Shinyaku Kabushiki Kaisha: *See*—
Nishimori, Shozo; and Eguma, Chikashi, 4,707,263, Cl. 210-484.000.

Shiraishi, Yoshitaka: *See*—
Maruyama, Seiichiro; Hayashida, Hironori; Morita, Kazumasa; and Shiraishi, Yoshitaka, 4,707,512, Cl. 524-504.000.

Shiraki, Manabu: *See*—
Miyao, Osami; Shiraki, Manabu; and Ohsaka, Masayuki, 4,707,645, Cl. 318-254.000.

Shirato, Yoshiaki: *See*—
Hara, Toshitami; Sato, Yasushi; Takatori, Yasushi; and Shirato, Yoshiaki, 4,707,705, Cl. 346-75.000.

Shoaf, Joseph: *See*—
Sukup, Richard A.; and Shoaf, Joseph, 4,706,933, Cl. 251-54.000.

Shoji, Leigh A.: *See*—
Anderson, Andrew G.; and Shoji, Leigh A., 4,706,521, Cl. 74-785.000.

Short, Edward H., III, to BS&B Safety Systems, Inc. Temperature responsive pressure relief apparatus and method. 4,706,698, Cl. 137-68.100.

Shriver, David A.: *See*—
Rosenthale, Marvin E.; Shriver, David A.; and Katz, Laurence B., 4,707,495, Cl. 514-530.000.

Shuskus, Alexander J., to United Technologies Corporation. Passivation of gallium arsenide by nitrogen implantation. 4,706,377, Cl. 437-24.000.

Si, Stephen S. C.: *See*—
Lee, Hsiao-Peng S.; Rawlinson, Stephen J.; and Si, Stephen S. C., 4,707,783, Cl. 364-200.000.

Sickert, Armin: *See*—
Schafer, Walter; Muller, Hanns P.; Kuchenmeister, Rolf; and Sickert, Armin, 4,707,386, Cl. 427-386.000.

Siegel, Hardo: *See*—
Fritz, Gerhard; Eggersdorfer, Manfred; and Siegel, Hardo, 4,707,549, Cl. 544-336.000.
Gramlich, Walter; and Siegel, Hardo, 4,707,302, Cl. 512-11.000.

Sielaff, Ulrich. Modular furniture construction. 4,706,573, Cl. 108-111.000.

Siemens Aktiengesellschaft: *See*—
Dehner, Guenter, 4,707,786, Cl. 364-414.000.
Falkenstein, Rudolf; Haberland, Detlef; Kaindl, Michael; Haltenorth, Helmut; Prussas, Herbert; and Taumberger, Franz, 4,707,066, Cl. 350-96.200.
Fischer, Helmut, 4,707,842, Cl. 375-110.000.
Giebel, Wolfgang; and Meixner, Heinrich, 4,707,200, Cl. 156-48.000.
Gose, Horst; and Papiernik, Wolfgang, 4,707,780, Cl. 364-176.000.
Haberland, Detlef; Langenwalter, Michael; Panzer, Klaus; Rosen, Hans G.; Spaeter, Lothar; Spaeth, Werner; Seibert, Bernd; and Haltenorth, Helmut, 4,707,067, Cl. 350-96.200.
Kraft, Heinz-Peter, 4,707,071, Cl. 350-96.210.
Moeller, Reiner; Hetzel, Gert; Saugeon, Ulrich; Boheim, Gustav; and Zurinski, Viktor, 4,707,813, Cl. 367-103.000.
Panse, Hubert; and Schlegel, Wolfgang, 4,707,775, Cl. 363-37.000.

Sierracin Corporation: *See*—
Voss, David L.; DeCamp, Howard S.; and Culp, Gordon W., 4,707,586, Cl. 219-203.000.

Sievers, Horst: *See*—
Schulz-Hennig, Joerg; and Sievers, Horst, 4,707,597, Cl. 250-209.000.

Signode Corporation: *See*—
Cheung, Nelson, 4,707,390, Cl. 428-57.000.

Silcox, Ronald W., to B.C. Clean Wood Preservers Ltd. Incisor cleaning system. 4,706,722, Cl. 144-329.000.

Silva, Julio C.; Gaiso, Ubirajara; and Novicki, Eduardo M., to Petroleo Brasileiro S.A. Process for the retorting of hydrocarbon-containing solids. 4,707,248, Cl. 208-409.000.

Siman, Jaime E., to Westinghouse Electric Corp. Consolidated magnetic core containing amorphous metal. 4,707,678, Cl. 336-210.000.

Simmons Nominees Pty. Ltd.: *See*—
Simmons, Thomas E., 4,707,496, Cl. 514-531.000.

Simmons, Thomas E., to Simmons Nominees Pty. Ltd. Insect repellent soap composition. 4,707,496, Cl. 514-531.000.

Simon, Horst: *See*—
Blattner, Dietmar; Dieterle, Hermann; Leutwein, Manfred; and Simon, Horst, 4,706,370, Cl. 29-564.200.

Simon, Merlin E., to Deere & Company. Utility hauling vehicle having four wheel drive. 4,706,770, Cl. 180-24.020.

Simpson-Davis, Raymond: *See*—
Etherington, Harry J. C.; Joslin, Paul C.; Carr, David E.; and Simpson-Davis, Raymond, 4,707,573, Cl. 178-18.000.

Sims, G. Wyatt: *See*—
Sims, Graham D.; and Sims, G. Wyatt, 4,706,642, Cl. 126-9.00R.

Sims, Graham D.; and Sims, G. Wyatt. Folding camp stove/oven apparatus. 4,706,642, Cl. 126-9.00R.

Sims, Keith J.: *See*—
Parsi, Edgardo J.; Sims, Keith J.; and Goldstein, Arthur L., 4,707,240, Cl. 204-290.00F.

Singhal, Surendra N.: *See*—
Korcz, William H.; and Singhal, Surendra N., 4,706,833, Cl. 220-67.000.

Singleman, Alfred H.; Singleman, Alfred H., Jr.; and Singleman, Erick R. Game of chance. 4,706,961, Cl. 273-274.000.

Singleman, Alfred H., Jr.: *See*—
Singleman, Alfred H.; Singleman, Alfred H., Jr.; and Singleman, Erick R., 4,706,961, Cl. 273-274.000.

Singleman, Erick R.: *See*—
Singleman, Alfred H.; Singleman, Alfred H., Jr.; and Singleman, Erick R., 4,706,961, Cl. 273-274.000.

Sinnamon, Robert H.: *See*—
Oglesby, Donald L.; and Sinnamon, Robert H., 4,706,712, Cl. 138-126.000.

Sirazi, Semir: *See*—
Bione, Angelo A.; and Sirazi, Semir, 4,707,827, Cl. 370-85.000.

SiScan Systems, Inc.: *See*—
Lindow, James T.; Bennett, Simon D.; and Smith, Ian R., 4,707,610, Cl. 250-560.000.

Sivachenko, Eugene W.; and Broscha, Firoze H., to Sivachenko, Eugene W. Lightweight bridge structure. 4,706,319, Cl. 14-73.000.

Sivalingam, Ramalingam, to Mirram Drive Inc. Two speed accessory transmission with optional neutral mode. 4,706,520, Cl. 74-781.00R.

Sixsmith, Thomas. Interior storm window. 4,706,729, Cl. 160-369.000.

Sjoberg, Per: *See*—
Schmid, Hermann; Sjoberg, Per; and Svensson, Leif, 4,706,567, Cl. 102-318.000.

Sjostrom, Sten-Ove: *See*—
Astner, Gunnar; and Sjostrom, Sten-Ove, 4,706,943, Cl. 266-265.000.

SKF Nova AB: *See*—
Lind, Bjorn, 4,706,966, Cl. 277-27.000.

SKF Steel Engineering AB: *See*—
Astner, Gunnar; and Sjostrom, Sten-Ove, 4,706,943, Cl. 266-265.000.

Sklarski, Dennis J.: *See*—
Doyle, Arthur F.; and Sklarski, Dennis J., 4,707,209, Cl. 156-307.400.

Skopek, Karl. Adjustable stamp. 4,706,564, Cl. 101-111.000.

Skutnik, Bolesh J.; and Brielmann, Harry L., Jr., to Ensign-Bickford Industries, Inc. Coating compositions for optical fibers. 4,707,076, Cl. 350-96.340.

Slatter, Richard C.: *See*—
Weir, Donald A., deceased; Walsh, William A. G.; and Slatter, Richard C., 4,707,831, Cl. 370-94.000.

Slavkovsky, Jan: *See*—
Blaskovits, Pavol; Lesnak, Stefan; Martisik, Alojz; Zajac, Jan; Slavkovsky, Jan; Turiansky, Ladislav; and Levius, Rudolf, 4,707,581, Cl. 219-73.110.

Sloan, Haskell F.: *See*—
Jenkins, Jerry V.; Sloan, Haskell F.; Frenkel, Robert L.; and Zielinski, Albert, 4,707,251, Cl. 209-569.000.

Sloop, Conrad B.: *See*—
Ohlig, Ernest; and Sloop, Conrad B., 4,707,125, Cl. 355-94.000.

Smith, Allen C., Jr., to Westinghouse Electric Corp. Steam generator having an auxiliary recirculation path. 4,706,613, Cl. 122-32.000.

Smith, Clinton R.: *See*—
Brewster, Phillip W.; and Smith, Clinton R., 4,707,285, Cl. 252-50.000.

Smith, Ian J.: *See*—
Irlam, Geoffrey; and Smith, Ian J., 4,707,288, Cl. 252-121.000.

Smith, Ian R.: *See*—
Lindow, James T.; Bennett, Simon D.; and Smith, Ian R., 4,707,610, Cl. 250-560.000.

Smith, John L. Floating pool assembly. 4,706,307, Cl. 4-487.000.

Smith, Johnny M., Jr., to Smith, Johnny M., Jr. Vehicle anti-pollution exhaust device. 4,706,454, Cl. 60-274.000.

Smith, Lonnie J.; Petermann, Steven G.; and Wood, Dennis R., to Atlantic Richfield Company. Wireline tool connector. 4,706,744, Cl. 166-65.100.

Smith, Loren G.: *See*—
Kohls, Mitchell L.; Smith, Loren G.; and Zahringer, H. David, 4,706,821, Cl. 211-593.000.

Smith, Ronald A. Sink strainer with bridged stem. 4,706,306, Cl. 4-286.000.

Smith, Ronald E., to Marathon Oil Company. Oil recovery process using a delayed polymer gel. 4,706,754, Cl. 166-295.000.

Smith, Wayne A., to Kearney-National, Inc. Disconnect switch with latch. 4,707,574, Cl. 200-48.0KB.

Smithkline Beckman Corporation: *See*—
Bondinell, William E.; Wen-Fu Ku, Thomas; and Ormsbee, Herbert S., III, 4,707,483, Cl. 514-273.000.
Kaiser, Carl; and Kruse, Lawrence I., 4,707,485, Cl. 514-307.000.
Kaiser, Carl; and Kruse, Lawrence I., 4,707,488, Cl. 514-381.000.
Kirsh, Richard L.; and Ravin, Louis J., 4,707,470, Cl. 514-31.000.

Smolders, Cornelis. Rotating cutting element. 4,706,534, Cl. 83-844.000.

Snook, James A.; Nelson, Thomas W.; Wyble, Marilyn S.; and Trimble, Russell L., to Puritan-Bennett Corporation. Inspiration oxygen saver. 4,706,664, Cl. 128-204.230.

Snyder, Francis H., Jr. Home chocolate processing apparatus. 4,706,558, Cl. 99-455.000.

Soberalski, Edward D.; and Miller, Craig, to Haworth, Inc. Keyboard support with automatic lowering mechanism. 4,706,919, Cl. 248-281.100.

Societe Civile Bioprojet: *See—*
Arrang, Jean-Michel; Garbarg, Monique; Lancelot, Jean-Charles; Lecomte, Jeanne-Marie; Robba, Max-Fernand; and Schwartz, Jean-Charles, 4,707,487, Cl. 514-326.000.

Societe Degremont: *See—*
Durot, Jean; and Prevot, Claude, 4,707,252, Cl. 210-151.000.

Societe Industrielle Pecquet, Tesson: *See—*
Chalimbaud, Max, 4,706,743, Cl. 165-134.100.

Societe Nationale d'Etude et de Construction de Moteurs d'Aviation "S.N.E.C.M.A.": *See—*
Naudet, Jacky; and Stenneler, Jacques M. P., 4,706,354, Cl. 29-156.80R.

Societe Nationale d'Etude et de Construction de Moteurs d'Aviation (SNECMA): *See—*
Martinou, Robert; and Ruimi, Michel, 4,707,191, Cl. 134-3.000.

Societe Nationale Industrielle Aerospatiale: *See—*
Aubry, Jacques, 4,706,364, Cl. 29-458.000.

Sollatek Limited: *See—*
Allos, Janan E., 4,707,760, Cl. 361-90.000.

Soltermack, Gilbert W., to De Cesare, Jim L. Method for driving an engine. 4,706,462, Cl. 60-712.000.

Somerville, Thomas A., to Burr-Brown Corporation. Metal oxide semiconductor stabilized dc to dc/ac converter. 4,707,776, Cl. 363-134.000.

Somogyi, Agnes: *See—*
Czvikovszky, Tibor; Kovacs, Gabor; Lakner, Endre; Mahr, Lajos; Somogyi, Agnes; Mikes, Sandor; Kegly, Gyorgy; Muzsai, Istvan; Palotas, Laszlo ; and Pfisztner, Nandor, 4,706,711, Cl. 138-103.000.

Sony Corporation: *See—*
Dodds, Robert E.; Goodwin, David S.; and Patel, Himanshu M., 4,707,426, Cl. 430-25.000.
Hayakawa, Masatoshi; Aso, Koichi; Ochiai, Yoshitaka; Matsuda, Hideki; Hayashi, Kazuhiko; Ishikawa, Wataru; and Iwasaki, You, 4,707,417, Cl. 428-630.000.
Kakizaki, Takehiro; Araki, Shoji; and Numata, Shinichi, 4,707,634, Cl. 313-432.000.
Segawa, Takashi; and Tsuboi, Kunio, 4,707,321, Cl. 264-294.000.
Suzuki, Tadao; Nakamura, Shoichi; Nishioka, Hisao; and Ohkubo, Yutaka, 4,707,818, Cl. 369-59.000.
Tateyama, Norihiro; Yamazaki, Kazuo; Kato, Hiroshi; and Teshima, Haruhito, 4,707,635, Cl. 313-466.000.

Sorensen, Jay R.; and LaPerna, Joseph D., to SpaceLabs, Inc. Ambulatory blood pressure apparatus. 4,706,684, Cl. 128-677.000.

Sorensen, Jens R.: *See—*
Thorsen, Niels P.; Jessen, Gilbert W.; Thomsen, Erik; and Sorensen, Jens R., 4,706,467, Cl. 62-139.000.

Sorimachi, Kanehiro; and Amitani, Joji, to Canon Kabushiki Kaisha. Actuating device. 4,707,642, Cl. 318-37.000.

Sotos, Lynn S.: *See—*
Hunter, Jennie C.; Belt, Angela; Sotos, Lynn S.; and Fonda, Michelle E., 4,707,447, Cl. 435-132.000.

Sottini, Stefano; Brenci, Massimo; Falciai, Riccardo; and Russo, Vera, to Consiglio Nazionale Delle Ricerche. Method of making variable section fiber optics. 4,707,172, Cl. 65-3.110.

South African Inventions Development Corporation: *See—*
Wedlake, Roger J., 4,707,420, Cl. 429-11.000.

South Bend Lathe, Inc.: *See—*
Backe, Bengt S.; and Durham, La Moyne W., 4,706,456, Cl. 60-368.000.

Southwell, William H., to Rockwell International Corporation. Incremental monitoring of thin films. 4,707,611, Cl. 250-560.000.

SpaceLabs, Inc.: *See—*
Sorensen, Jay R.; and LaPerna, Joseph D., 4,706,684, Cl. 128-677.000.

Spaeter, Lothar: *See—*
Haberland, Detlef; Langenwalter, Michael; Panzer, Klaus; Rosen, Hans G.; Spaeter, Lothar; Spaeth, Werner; Seibert, Bernd; and Haltenorth, Helmut, 4,707,067, Cl. 350-96.200.

Spaeth, Werner: *See—*
Haberland, Detlef; Langenwalter, Michael; Panzer, Klaus; Rosen, Hans G.; Spaeter, Lothar; Spaeth, Werner; Seibert, Bernd; and Haltenorth, Helmut, 4,707,067, Cl. 350-96.200.

Spamer, William S.; and Leverette, David S., to Mead Corporation, The. Gravity feed shelf for store gondolas. 4,706,820, Cl. 211-59.200.

Sparrowhawk, Bryan L., to John Fluke Mfg. Co., Inc. Sample isolation in integrating analog-to-digital converters. 4,707,680, Cl. 340-347.0NT.

Specialty Maintenance and Construction, Inc.: *See—*
Garringer, Lester G., 4,706,367, Cl. 29-526.00R.

Specialty Products, Inc.: *See—*
Pettibone, Craig R.; and Berry, Jimmy D., 4,706,987, Cl. 280-661.000.

Spector, Donald. Cosmetic cream applicator. 4,706,693, Cl. 132-79.00R.

Spector, Donald. Light-activated aroma generator with automatic cutoff. 4,707,338, Cl. 422-124.000.

Spector, George: *See—*
Padfield, Barbara J.; and Spector, George, 4,706,302, Cl. 2-22.000.

Spectramed, Inc.: *See—*
Goorsky, Mark S.; Koch, Mark B.; and Murray, Richard C., Jr., 4,706,677, Cl. 128-634.000.

Spence, Jerry L., to Instrumed, Inc. Closures and methods of closure for a sterilization container system. 4,706,839, Cl. 220-315.000.

Spinelli, Thomas S.; and Deras, Edward J., to Texas Instruments Incorporated. Shipping and dispensing package for a series of articles. 4,706,812, Cl. 206-332.000.

Spiro America Inc.: *See—*
Castricum, Wilhelmus P. H., 4,706,481, Cl. 72-49.000.

Spoeler, Johannes-Gerhard; and Janssen, Heinz-Uwe, to Mannesmann AG. Lifting and lowering a rail section. 4,706,782, Cl. 187-20.000.

Sport Graphics, Inc.: *See—*
Jacober, Jeffrey M., 4,706,856, Cl. 224-151.000.

Sportelli, Louis; and Winterstein, James F. Full spine shielding means. 4,707,846, Cl. 378-145.000.

Spraco, Inc.: *See—*
Hofmann, Hans J., 4,706,889, Cl. 239-550.000.

Sprague Electric Company: *See—*
Bernard, Walter J.; and Fresia, E. James, 4,706,375, Cl. 29-570.100.

Sprenger, Willi, to General Motors Corporation. Electrically heatable automobile window power-supply connector assembly. 4,707,591, Cl. 219-541.000.

Stabilus GmbH: *See—*
Lauderbach, Leo, 4,706,333, Cl. 16-289.000.

Stahlecker, Fritz: *See—*
Feuchter, Wolfgang; and Goetz, Dieter, 4,706,450, Cl. 57-88.000.

Stahlecker, Hans: *See—*
Feuchter, Wolfgang; and Goetz, Dieter, 4,706,450, Cl. 57-88.000.

Standard Oil Company, The: *See—*
Wu, Mu-Yen M.; Ball, Lawrence E.; and Coffey, Gerald P., 4,707,538, Cl. 528-315.000.

Stanford University: *See—*
Kim, Byoung Y., 4,707,136, Cl. 356-350.000.

Stanley Electric Co., Ltd.: *See—*
Kudo, Sinji, 4,707,763, Cl. 361-386.000.

Stanley G. Flagg & Co., Inc.: *See—*
Kalaskie, William S.; and Hughes, David E., 4,706,929, Cl. 251-14.000.

Stant Inc.: *See—*
Harris, Robert S., 4,707,164, Cl. 55-168.000.

Stark, Richard A., to Eastman Kodak Company. Scanning apparatus. 4,707,055, Cl. 350-3.710.

Stauffer Chemical Company: *See—*
Gustafson, Carl G.; and Ertell, Carolyn A., 4,707,361, Cl. 424-154.000.

Stavrianopoulos, Jannis G., to Enzo Biochem, Inc. Method of radioactively labeling diagnostic and therapeutic agents containing a chelating group. 4,707,352, Cl. 424-1.100.

Stavrianopoulos, Jannis G., to Enzo Biochem, Inc. Nucleic acid hybridization assay and detectable molecules useful in such assay. 4,707,440, Cl. 435-6.000.

STC plc: *See—*
Froggatt, Dennis G., 4,707,826, Cl. 370-60.000.
Weir, Donald A., deceased; Walsh, William A. G.; and Slatter, Richard C., 4,707,831, Cl. 370-94.000.

Steel Heddle Manufacturing Co., Inc.: *See—*
Root, Steven J.; and Grigsby, James D., 4,706,717, Cl. 139-92.000.

Steele, Dennis L.: *See—*
Wang, Chun S.; Liao, Zeng-kun; and Steele, Dennis L., 4,707,558, Cl. 568-23.000.

Stein Industrie: *See—*
Fournier, Jean; and Patron, Henri, 4,706,614, Cl. 122-510.000.

Steiner, Karl: *See—*
Mullner, Josef; Schiel, Christian; and Steiner, Karl, 4,707,222, Cl. 162-205.000.

Stener, Werner: *See—*
Gerstner, Richard; Look, Gunter; Seybold, Werner; and Stener, Werner, 4,707,034, Cl. 301-6.00V.

Stenneler, Jacques M. P.: *See—*
Naudet, Jacky; and Stenneler, Jacques M. P., 4,706,354, Cl. 29-156.80R.

Stenz, Karl; and Baltes, Horst, to General Motors Corporation. Device for releasably connecting a seat portion to the vehicle body. 4,707,033, Cl. 297-452.000.

Stephens, Keith E.; and Uzee, Andre J., to Dow Chemical Company, The. Low viscosity, semicrystalline chlorinated polyethylene resins and articles formed therefrom. 4,707,522, Cl. 525-334.100.

Steudle, Ernst; Zillikens, Josef; and Boling, Gerd, to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung; and Steudle, Ernst. Method and apparatus for the determination of substances dissolved in a solvent. 4,706,495, Cl. 73-64.300.

Stevens, George L., to Morton Thiokol, Inc. Mechanical impact sensor for automotive crash bag systems. 4,706,990, Cl. 280-734.000.

Stewart, David A.: *See—*
Schneider, Alan A.; Stewart, David A.; Jolson, Joseph D.; Auel, RaeAnn M.; and Price, John F., 4,707,242, Cl. 204-412.000.

Stewart, Victor M., to Industrial Research Development, Inc. Roofing cant. 4,706,418, Cl. 52-58.000.

Stewart, Victor M., to Industrial Research Development, Inc. Prefabricated interlocking roofing system. 4,706,435, Cl. 52-533.000.

Steyr-Daimler-Puch Aktiengesellschaft: *See—*
Laimbock, Franz, 4,706,618, Cl. 123-73.0AA.

Stjernberg, Klas G.: *See—*
Schachner, Herbert; Tippmann, Heinz; Lux, Benno; Stjernberg, Klas G.; and Thelin, Anders G., 4,707,384, Cl. 427-249.000.

Stokes, Robert B.; Yen, Kuo-Hsiung; Lau, Kei-Fung; Kagiwada, Reynold S.; and Delaney, Michael J., to TRW Inc. Isotropic acoustic wave substrate. 4,707,631, Cl. 310-313.00A.

Stone, Glen: *See—*
Dodge, Larry H.; and Stone, Glen, 4,707,276, Cl. 210-789.000.

Stonesifer, Gerald M.; and Harkey, Charles E. Caulking gun with means to prevent rotation of compound cartridge during use and to provide positive pressure release. 4,706,853, Cl. 222-391.000.
Storino, Charles: *See*—
Danloup, Andre ; Galzandat, Pierre; Hubin, Claude; and Storino, Charles, 4,707,089, Cl. 351-138.000.
Storni, Angelo: *See*—
Blattner, Hans; and Storni, Angelo, 4,707,476, Cl. 514-215.000.
Storrick, Gary D., to Westinghouse Electric Corp. Controlling the response of a pressurized water reactor to rapid fluctuations in load. 4,707,324, Cl. 376-215.000.
Strand, Theodore L., to Liquidometer Corporation. Safety breakaway electrical connector construction. 4,707,046, Cl. 439-314.000.
Strange, Ian A.: *See*—
Titcombe, Ian R. A.; and Strange, Ian A., 4,707,566, Cl. 174-78.000.
Stratton, Boyd L., to Harris Corporation. Sync detector having noise adjusted slice level. 4,707,740, Cl. 358-153.000.
Stratton, Boyd L., to Harris Corporation. Video signal clamping with clamp pulse width variation with noise. 4,707,741, Cl. 358-171.000.
Strausburg, Larry D., to Monarch Marking Systems, Inc. Method of attaching tags. 4,706,362, Cl. 29-432.000.
Stromberg, Wilfried; and Kuhnigk, Theo, to Becker-Pronte GmbH. Chain lock for round link chain strands particularly for use in mining. 4,706,451, Cl. 59-85.000.
Strumpfabriken Vinetta Aktiebolag: *See*—
Lovqvist, Bo, 4,706,411, Cl. 47-30.000.
Studt, William L.; Zimmerman, Harry K.; and Dodson, Stuart A., to Rorer Pharmaceutical Corporation. Heterocyclic amidino substituted ureas and their pharmaceutical uses. 4,707,478, Cl. 514-580.000.
Stuetz, Dagobert E.: *See*—
Buckley, Alan; Choe, Eui W.; Stuetz, Dagobert E.; and Garito, Anthony F., 4,707,303, Cl. 252-583.000.
Sturdivant, Jerry L.: *See*—
Boyer, James A.; Bridgewater, Bobbie D.; Warner, Donald C.; and Sturdivant, Jerry L., 4,706,639, Cl. 123-647.000.
Sturm, Budd H.; and Kuczkowski, Joseph A., to Goodyear Tire & Rubber Company, The. Autosynergistic phenolic antioxidant reaction product. 4,707,300, Cl. 252-404.000.
Stwiorok, Andreas: *See*—
Cloke, Martin; Horton, Michael; Menne, Rudolf; and Stwiorok, Andreas, 4,706,622, Cl. 123-306.000.
Stypulkowski, Paul H.; and van den Honert, Christopher, to Minnesota Mining and Manufacturing Company. External ear canal electrode to be placed proximate the tympanic membrane. 4,706,682, Cl. 128-642.000.
Subsea Engineering Associates, Inc.: *See*—
Coles, Bryan W., 4,707,128, Cl. 356-4.000.
Sugano, Akira: *See*—
Yamada, Hiroshi; Iioka, Michihiro; Sugano, Akira; Takita, Atsushi; Nigawara, Seiitsu; and Fukai, Masayuki, 4,707,778, Cl. 364-132.000.
Sugano, Shozo: *See*—
Yamaguchi, Noriaki; Sugano, Shozo; and Enomoto, Kayo, 4,707,371, Cl. 426-462.000.
Suganuma, Tsuyoshi: *See*—
Sano, Tomohiko; Fujisawa, Noriyoshi; Fukuda, Masataka; and Suganuma, Tsuyoshi, 4,707,292, Cl. 252-174.160.
Sugimori, Shigeru; and Goto, Yasuyuki, to Chisso Corporation. Alkoxyethoxybenzoic acid ester derivatives. 4,707,296, Cl. 252-299.670.
Sugita, Masao: *See*—
Bandou, Masaaki; Sugita, Masao; and Marumo, Takachi, 4,706,487, Cl. 72-355.000.
Sugita, Minoru; Nakatsuji, Teruyuki; Fujisaki, Tadashi; Hiraga, Hisao; Nishimoto, Takashi; and Futagawa, Minoru, to Shimizu Construction Co., Ltd.; and Dainihon Glass Industry Co., Ltd. Concrete reinforcing unit. 4,706,430, Cl. 52-309.160.
Sugita, Yutaka: *See*—
Ohta, Norio; Okamine, Shigenori; Sugita, Yutaka; Seo, Yosuke; and Tamura, Takashi, 4,707,755, Cl. 360-114.000.
Suh, Nam P.: *See*—
Sanchez-Caldera, Luis E.; Suh, Nam P.; Chun, Jung-Hoon; Lee, Arthur K.; and Blackall, Frederick S., IV, 4,706,730, Cl. 164-135.000.
Sukup, Richard A.; and Shoaf, Joseph. Oil and gas well safety valve. 4,706,933, Cl. 251-54.000.
Sullivan, Herbert W.; and Cohn, Leonard A., to Chopp Computer Corp. Shared memory computer method and apparatus. 4,707,781, Cl. 364-200.000.
Sullivan, Paul E.: *See*—
Peppel, George W.; and Sullivan, Paul E., 4,706,998, Cl. 285-167.000.
Sullivan, Steven K.; and Branson, Christopher W., to Tektronix, Inc. Adjustable impedance driver network. 4,707,620, Cl. 307-270.000.
Sulzer Brothers Limited: *See*—
Griffith, John D., 4,706,716, Cl. 139-91.000.
Scharer, Bernhard, 4,706,714, Cl. 139-1.00R.
Sumitomo Chemical Company, Limited: *See*—
Katsuki, Hiroshi; and Daimon, Akio, 4,707,514, Cl. 524-505.000.
Sumitomo Light Metal Industries, Ltd.: *See*—
Tsuchida, Shin; and Ito, Hideo, 4,707,195, Cl. 148-11.50A.
Sumitomo Metal Industries, Ltd.: *See*—
Ikeda, Satoshi; and Suzuki, Nobukazu, 4,707,415, Cl. 428-621.000.
Sumitomo Metal Mining Company Limited: *See*—
Kimura, Takayoshi; Tsuyuguchi, Seiichi; and Mori, Yoshiaka, 4,707,185, Cl. 75-24.000.
Sunkist Growers, Inc.: *See*—
Miller, Dennis H.; and Mutka, Jerry R., 4,707,367, Cl. 426-96.000.
Sunstar Engineering Inc.: *See*—
Nagata, Tsuyoshi; and Fujita, Katsuto, 4,707,613, Cl. 250-572.000.
Suppinger, Albert V.; and Tinley, Charles W., to North American Philips Corporation. Assembly for packaging microcircuits having gold plated grounding and insulating leads, and method. 4,706,382, Cl. 29-879.000.
Suprise, Jody D.: *See*—
Van Gompel, Paul T.; and Suprise, Jody D., 4,706,303, Cl. 2-49.00R.
Suresky, Arnold, to Faraday Laboratories, Inc. Process for treating wet fat biological tissue using a water miscible solvent. 4,707,369, Cl. 426-417.000.
Surface Science Laboratories, Inc.: *See*—
Knorr, Fritz J., 4,707,602, Cl. 250-282.000.
Sutton, Wesley D., Jr.: *See*—
Shannon, William H.; and Sutton, Wesley D., Jr., 4,706,952, Cl. 272-85.000.
Suyama, Hitoshi: *See*—
Akabane, Jun; and Suyama, Hitoshi, 4,707,101, Cl. 354-289.100.
Suzaki, Masafumi: *See*—
Kitagishi, Tomoji; Sasaki, Akira; Hakoyama, Akiyoshi; Furukawa, Shigetaka; Suzaki, Masafumi; Kobayashi, Ryooichi; Mikami, Katsumasa; Takahashi, Yoshihito; Nagano, Yousuke; and Honma, Takeo, 4,707,708, Cl. 346-76.0PH.
Suzuki, Akira; Tanaka, Hideki; and Murakami, Gen, to Hitachi, Ltd. Semiconductor device and method of manufacturing thereof. 4,707,724, Cl. 357-71.000.
Suzuki, Hidetoshi: *See*—
Ayata, Naoki; Saito, Seiji; Suzuki, Hidetoshi; Ozawa, Kunitaka; and Koumura, Noboru, 4,707,713, Cl. 346-140.00R.
Suzuki, Hirosuke; and Umebayashi, Tetsuro, to Junkosha Co., Ltd. Electrical transmission line. 4,707,671, Cl. 333-1.000.
Suzuki, Kenji: *See*—
Nishi, Tomoya; Amari, Mitsuhiro; and Suzuki, Kenji, 4,707,153, Cl. 400-121.000.
Suzuki, Nobukazu: *See*—
Ikeda, Satoshi; and Suzuki, Nobukazu, 4,707,415, Cl. 428-621.000.
Suzuki, Shigeru: *See*—
Ohshima, Kiyoshi; Suzuki, Shigeru; Mashiko, Harumitsu; and Ohdake, Eisyu, 4,707,126, Cl. 355-14.0SH.
Suzuki, Tadao; Nakamura, Shoichi; Nishioka, Hisao; and Ohkubo, Yutaka, to Sony Corporation. Method and apparatus for recording digitized information on a disc. 4,707,818, Cl. 369-59.000.
Suzuki, Toshiro; Fujii, Fumiaki; and Yamada, Izuru, to Hitachi, Ltd. Integrated circuit having input and output terminals for testing. 4,707,654, Cl. 324-158.00R.
Svatos, Joseph D. Rolling mill cooling system. 4,706,480, Cl. 72-17.000.
Svensson, Leif: *See*—
Schmid, Hermann; Sjoberg, Per; and Svensson, Leif, 4,706,567, Cl. 102-318.000.
SW Industries, Inc.: *See*—
Galliant, James O., 4,706,349, Cl. 26-104.000.
Swain, David M.; and Tansey, Richard J., to Rockwell International Corporation. Apparatus and method for the recording and readout of multiple exposure holograms. 4,707,135, Cl. 356-347.000.
Swan, Jye P.; Weinerman, Lee S.; and Mayo, Steven A., to Eastern Company, The. Rotary handle operated door lock. 4,706,478, Cl. 70-208.000.
Swarthoff, Ton: *See*—
Thom, David; Swarthoff, Ton; and Maat, Jan, 4,707,291, Cl. 252-174.120.
Sweeny, Henry D., to Swenco Limited. Tape applicator. 4,707,202, Cl. 156-71.000.
Swenco Limited: *See*—
Sweeny, Henry D., 4,707,202, Cl. 156-71.000.
Swift, Joseph A., to Xerox Corporation. Electrostatic charging and cleaning brushes. 4,706,320, Cl. 15-1.50R.
Syntex (U.S.A.) Inc.: *See*—
Muchowski, Joseph M.; Greenhouse, Robert J.; and Guzman, Angel, 4,707,473, Cl. 514-63.000.
Systems and Support, Incorporated: *See*—
Jahr, Ronald S.; and Cowell, Thomas H., 4,707,852, Cl. 379-107.000.
Ta Triumph-Adler A.G.: *See*—
Hofmann, Norbert, 4,707,158, Cl. 400-616.200.
Tabacchi, Vittorio. Lorgnette eyeglass frame. 4,707,088, Cl. 351-56.000.
Tachibana, Hidekiyo: *See*—
Terao, Kazuo; Kubo, Tsutomu; Hyakutake, Nobuo; Tachibana, Hidekiyo; Hama, Jun-ichi; Teshigawara, Touru; and Kajimoto, Masashi, 4,707,428, Cl. 430-102.000.
Tachibana, Shinro: *See*—
Yoshino, Hiroshi; Tsuchiya, Yutaka; Kaneko, Takeru; Nakazawa, Takahiro; Ikeda, Masuhiro; Araki, Shin; Yamatsu, Kiyomi; Tachibana, Shinro; and Arakawa, Yoshihiro, 4,707,468, Cl. 514-16.000.
Taguchi, Masahiro: *See*—
Tashiro, Syuzaburo; Ina, Toshikazu; Taguchi, Masahiro; Onimaru, Sadahisa; Nakano, Osamu; and Kuno, Akira, 4,707,788, Cl. 364-424.000.
Tahtouh, Joseph F.: *See*—
Callens, E. Eugene, Jr.; Crowson, Leslie L., Jr.; Kobs, Robert P.; Tull, Herbert G., III; and Tahtouh, Joseph F., 4,706,360, Cl. 29-407.000.

Tajima, Shoji; Kadomatsu, Yasuo; Miyazaki, Yoshio; Sakurai, Michikazu; and Anze, Kimio, to Ricoh Company, Ltd. Developer carrier and a method for manufacturing the same. 4,707,382, Cl. 427-58.000.

Takagi, Eizi, to Kabushiki Kaisha Toshiba. Vacuum holder. 4,707,012, Cl. 294-64.100.

Takagi, Hiroshi, to Omron Tateisi Electronics Co. Electronic cash register with means to enter discount prices directly by keyboard. 4,707,785, Cl. 364-405.000.

Takahashi, Fumio: *See*—
Toida, Akikazu; Iwata, Satoshi; Takahashi, Fumio; and Mimura, Takanobu, 4,707,703, Cl. 346-1.100.

Takahashi, Fumitaka; Kimura, Yoshihiko; Tsubata, Hideo; Ohji, Nobuaki; and Sashida, Kiyoshi, to Honda Giken Kogyo Kabushiki Kaisha. Optical switching unit. 4,707,057, Cl. 350-96.120.

Takahashi, Hitoshi, to Fujitsu Limited. Semiconductor integrated circuit device selected by an address signal. 4,707,802, Cl. 364-900.000.

Takahashi, Masao: *See*—
Inagaki, Tetsuya; Aoki, Hidemi; Aikawa, Hiroyasu; and Takahashi, Masao, 4,707,472, Cl. 514-58.000.

Takahashi, Tadashi; Miyashita, Kunio; and Kawamata, Syooichi, to Hitachi, Ltd. Magnetic position sensor. 4,707,695, Cl. 340-870.310.

Takahashi, Yoshihito: *See*—
Kitagishi, Tomoji; Sasaki, Akira; Hakoyama, Akiyoshi; Furukawa, Shigetaka; Suzaki, Masafumi; Kobayashi, Ryooichi; Mikami, Katsumasa; Takahashi, Yoshihito; Nagano, Yousuke; and Honma, Takeo, 4,707,708, Cl. 346-76.0PH.

Takanaka Komuten Co., Ltd: *See*—
Ohkochi, Katsutoshi; Shinozaki, Mamoru; Ohshita, Toshiyuki; Kitano, Masayasu; and Kamata, Seizo, 4,706,753, Cl. 166-286.000.

Takanashi, Kenichi; and Sakuma, Nobuo, to Ricoh Company, Ltd. Fθ lens for use in light beam scanner. 4,707,085, Cl. 350-480.000.

Takanashi, Mahito: *See*—
Ozaki, Yoshiaki; and Takanashi, Mahito, 4,707,751, Cl. 360-97.000.

Takao, Hisoka; Sato, Toshiro; Saito, Seiichi; and Hayashi, Toshinari, to Fujitsu Limited. GaAs MESFET logic buffers using enhancement and depletion FETs. 4,707,622, Cl. 307-448.000.

Takao, Shoichi: *See*—
Nakaoji, Kazuhiko; Kamao, Mitsugu; Itoh, Hayami; Tatsumi, Shuhei; and Takao, Shoichi, 4,706,891, Cl. 241-16.000.

Takaoka, Iwane: *See*—
Kanno, Masashi; Komori, Katsufumi; Tatekawa, Masaichirou; Miwa, Kiyohito; and Takaoka, Iwane, 4,707,109, Cl. 355-7.000.

Takashima, Masanobu; Satomura, Masato; Iwakura, Ken; and Igarashi, Akira, to Fuji Photo Film Co., Ltd. Recording material. 4,707,464, Cl. 503-216.000.

Takatori, Yasushi: *See*—
Hara, Toshitami; Sato, Yasushi; Takatori, Yasushi; and Shirato, Yoshiaki, 4,707,705, Cl. 346-75.000.

Takazume, Masafumi; and Ishikawa, Kazuhiko, to Sharp Kabushiki Kaisha. Convection cooking apparatus. 4,707,588, Cl. 219-400.000.

Takechi, Moriaki: *See*—
Saitou, Yosio; Kataoka, Takeshi; Takechi, Moriaki; and Matsumoto, Takahiro, 4,707,676, Cl. 335-216.000.

Takemae, Mikio: *See*—
Nakano, Yoshiyuki; and Takemae, Mikio, 4,707,095, Cl. 354-173.110.
Nishioka, Sunao; and Takemae, Mikio, 4,707,105, Cl. 354-412.000.

Takemae, Yoshihiro; Nakano, Tomio; Tatematsu, Takeo; Ogawa, Junji; Horii, Takashi; Fujii, Yasuhiro; Nakano, Masao; and Tsuge, Norihisa, deceased (by Tsuge, Itaru, Sachie Tsuge, heirs), to Fujitsu Limited. Semiconductor integrated circuit device having fuse-type information storing circuit. 4,707,806, Cl. 365-96.000.

Takemae, Yoshihiro; Nakano, Tomio; Nakano, Masao; and Sato, Kimiaki, to Fujitsu Limited. Semiconductor memory device having extended period for outputting data. 4,707,811, Cl. 365-239.000.

Takenaka, Kiyoshi; Ohtsuji, Masahiko; and Kabuto, Hiroaki, to Dainippon Screen Mfg. Co., Ltd. Copying machine with original-position confirming device. 4,707,117, Cl. 355-3.0SH.

Takeuchi, Hisaharu: *See*—
Ohue, Kazuto; Kondou, Toshiyuki; Takeuchi, Hisaharu; and Ikeda, Yuzo, 4,707,269, Cl. 210-651.000.

Takeuchi, Kunihiko; and Nogi, Hiroshi, to Tokyo Keiki Company Limited. Fluid control valve. 4,706,703, Cl. 137-487.500.

Takiar, Hem P.; Shah, Divyesh P.; and Hilton, Robert E., to National Semiconductor Corporation. Nickel plated copper tape. 4,707,418, Cl. 428-675.000.

Takihana, Masatoshi: *See*—
Tamaki, Nobuaki; Sakuma, Shinzo; Fukai, Toshimasa; and Takihana, Masatoshi, 4,707,577, Cl. 200-144.00B.

Takita, Atsushi: *See*—
Yamada, Hiroshi; Iioka, Michihiro; Sugano, Akira; Takita, Atsushi; Nigawara, Seiitsu; and Fukai, Masayuki, 4,707,778, Cl. 364-132.000.

Talacko, Radovan, to Ransburg-Gema AG. Method and apparatus for electrostatic coating of articles with powdered coating material. 4,706,890, Cl. 239-692.000.

Talbott, Larry L.: *See*—
Barach, Jeffrey T.; and Talbott, Larry L., 4,707,364, Cl. 426-36.000.

Tamada, Shinichi: *See*—
Ohkuni, Shinichiro; and Tamada, Shinichi, 4,706,724, Cl. 152-454.000.

Tamaki, Nobuaki; Sakuma, Shinzo; Fukai, Toshimasa; and Takihana, Masatoshi, to Kabushiki Kaisha Meidensha. Vacuum interrupter. 4,707,577, Cl. 200-144.00B.

Tamari, Nobuyuki: *See*—
Ebata, Yoshihiro; Hayami, Ryozo; Tamari, Nobuyuki; Toibana, Yasuo; and Kinoshita, Makoto, 4,707,416, Cl. 428-627.000.

Tamaru, Kiichiro, to Kabushiki Kaisha Toshiba. Fault-compensating digital information transfer apparatus. 4,707,833, Cl. 371-15.000.

Tamaru, Shusaku: *See*—
Ikeyama, Norio; Yoshioka, Noriaki; Tamaru, Shusaku; and Ichinose, Hisashi, 4,707,261, Cl. 210-433.200.

Tamura, Hideyuki: *See*—
Kasanami, Mitsuru; and Tamura, Hideyuki, 4,706,632, Cl. 123-492.000.

Tamura, Keiichi, to Kabushiki Kaisha Tokai-rika-denki-seisakusho. Apparatus for adjusting position of seatbelt webbing at which it is retained by vehicle body. 4,706,993, Cl. 280-808.000.

Tamura, Tadashi: *See*—
Nakamura, Toshio; Tamura, Tadashi; Kimura, Naomi; and Urata, Susumu, 4,706,555, Cl. 99-283.000.

Tamura, Takashi: *See*—
Ohta, Norio; Okamine, Shigenori; Sugita, Yutaka; Seo, Yosuke; and Tamura, Takashi, 4,707,755, Cl. 360-114.000.

Tanaka, Akira; and Watanabe, Hirokazu, to Yoshida Kogyo K. K. Button assembly. 4,706,344, Cl. 24-94.000.

Tanaka, Hideki: *See*—
Suzuki, Akira; Tanaka, Hideki; and Murakami, Gen, 4,707,724, Cl. 357-71.000.

Tanaka, Hiroyuki; Kin, Seki; and Pu, Lyong S., to Fuji Xerox Co., Ltd. Squarylium compound in an electrophotographic element. 4,707,427, Cl. 430-59.000.

Tanaka, Kanji; and Arai, Masashi, to Sanyo Electric Co., Ltd.; and Tokyo Sanyo Electric Co., Ltd. AM stereo receiver. 4,707,856, Cl. 381-15.000.

Tanaka, Koichi: *See*—
Ogura, Takashi; Tanaka, Koichi; Taniguchi, Koji; Yoshida, Masaru; and Mikami, Akiyoshi, 4,707,419, Cl. 428-690.000.

Tanaka, Minoru: *See*—
Fukushima, Eiji; Tanaka, Minoru; Sanada, Kazuo; and Chigira, Sadao, 4,707,075, Cl. 350-96.260.

Tanaka, Toshihide: *See*—
Mekata, Tsuyoshi; Saka, Hiroshi; and Tanaka, Toshihide, 4,707,669, Cl. 331-99.000.

Tani, Tatsuhiro: *See*—
Tomite, Tosio; Tani, Tatsuhiro; and Kobayashi, Hidemitsu, 4,707,630, Cl. 310-154.000.

Taniguchi, Haruyuki: *See*—
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Taniguchi, Koji: *See*—
Ogura, Takashi; Tanaka, Koichi; Taniguchi, Koji; Yoshida, Masaru; and Mikami, Akiyoshi, 4,707,419, Cl. 428-690.000.

Tanner, Jerome: *See*—
Kieff, Elliott; Tanner, Jerome; Hummel, Mary; and Beisel, Christopher, 4,707,358, Cl. 424-89.000.

Tansey, Richard J.: *See*—
Swain, David M.; and Tansey, Richard J., 4,707,135, Cl. 356-347.000.

Tanuma, Itsuo: *See*—
Morimura, Yasuhiro; Fukuura, Yukio; Ishikawa, Hikaru; Tanuma, Itsuo; and Honda, Toshio, 4,707,397, Cl. 428-216.000.

Tanzi, Giancarlo. Method for producing footwear. 4,706,316, Cl. 12-142.00T.

Tashima, Seiji: *See*—
Okimoto, Haruo; and Tashima, Seiji, 4,706,621, Cl. 123-216.000.

Tashiro, Syuzaburo; Ina, Toshikazu; Taguchi, Masahiro; Onimaru, Sadahisa; Nakano, Osamu; and Kuno, Akira, to Nippon Soken, Inc; and Nippondenso Co., Ltd. Automatic adjuster for automobile driver equipment. 4,707,788, Cl. 364-424.000.

Task, Harry L.; and Wyatt, Ivan S., to United States of America, Air Force. Portable glide slope indicator. 4,707,696, Cl. 340-954.000.

Tatekawa, Masaichirou: *See*—
Kanno, Masashi; Komori, Katsufumi; Tatekawa, Masaichirou; Miwa, Kiyohito; and Takaoka, Iwane, 4,707,109, Cl. 355-7.000.

Tatematsu, Takeo: *See*—
Takemae, Yoshihiro; Nakano, Tomio; Tatematsu, Takeo; Ogawa, Junji; Horii, Takashi; Fujii, Yasuhiro; Nakano, Masao; and Tsuge, Norihisa, deceased, 4,707,806, Cl. 365-96.000.

Tateyama, Norihiro; Yamazaki, Kazuo; Kato, Hiroshi; and Teshima, Haruhito, to Sony Corporation. Cathode ray tube having a fluorescent layer with varying amounts of silica. 4,707,635, Cl. 313-466.000.

Tatsumi, Shuhei: *See*—
Nakaoji, Kazuhiko; Kamao, Mitsugu; Itoh, Hayami; Tatsumi, Shuhei; and Takao, Shoichi, 4,706,891, Cl. 241-16.000.

Tauber, Thomas E.; and Horan, James L., to Aeroquip Corporation. Gas and fluid separator. 4,707,165, Cl. 55-204.000.

Taumberger, Franz: *See*—
Falkenstein, Rudolf; Haberland, Detlef; Kaindl, Michael; Haltenorth, Helmut; Prussas, Herbert; and Taumberger, Franz, 4,707,066, Cl. 350-96.200.

Taurus Gumiipari Vallalat: *See*—
Czvikovszky, Tibor; Kovacs, Gabor; Lakner, Endre; Mahr, Lajos; Somogyi, Agnes; Mikes, Sandor; Kegly, Gyorgy; Muzsai, Istvan; Palotas, Laszlo ; and Pfisztner, Nandor, 4,706,711, Cl. 138-103.000.

Taylor, Alwyn H.: *See*—
McVeigh, James B., Jr.; Reise, Terrence F.; and Taylor, Alwyn H., 4,707,421, Cl. 429-94.000.
Taylor, Benson T., Jr., to General Electric Company. Method of reinforcing a structural assembly. 4,706,363, Cl. 29-453.000.
Taylor, James R.: *See*—
Kuhns, John P.; and Taylor, James R., 4,706,355, Cl. 29-157.30C.
Taylor Made Products Co.: *See*—
Hall, David G., 4,706,804, Cl. 206-45.140.
Taylor, Mark P.: *See*—
Chyung, Kenneth; Fenn, Philip M.; and Taylor, Mark P., 4,707,458, Cl. 501-4.000.
Taylor, William A.; and Abrams, Martin L., to International Fuel Cells Corporation. Fuel cell coolant inlet manifold and system. 4,706,737, Cl. 165-47.000.
TDK Corporation: *See*—
Shiba, Haruo; and Sakata, Yoshiya, 4,707,757, Cl. 360-132.000.
Technicon Instruments Corp.: *See*—
Ahmad, Syed I.; and Hedaya, Eddie, 4,707,441, Cl. 435-7.000.
Gyori, Steven A., 4,706,736, Cl. 165-30.000.
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Krein, Philip T.; Meadows, Robert D.; Murdock, Bruce; and Teichmer, Daniel G., 4,707,845, Cl. 178-19.000.
Teijin Limited: *See*—
Chiba, Kiyoshi; Ino, Hiromitsu; and Tokumitsu, Kazuto, 4,707,198, Cl. 148-304.000.
Tektronix, Inc.: *See*—
Frisch, Arnold M.; Hollister, Allen L.; and Hutchinson, Larry L., 4,707,834, Cl. 371-20.000.
Krein, Philip T.; Meadows, Robert D.; Murdock, Bruce; and Teichmer, Daniel G., 4,707,845, Cl. 178-19.000.
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Sullivan, Steven K.; and Branson, Christopher W., 4,707,620, Cl. 307-270.000.
Tel Aviv University: *See*—
Keydar, Iafa, 4,707,438, Cl. 435-5.000.
Telectronics N.V.: *See*—
Breyer, Branko; Cikes, Ivo; and Ferek-Petric, Bozidar, 4,706,681, Cl. 128-642.000.
Telephone Cables Limited: *See*—
Heywood, Clifford, 4,707,074, Cl. 350-96.230.
Tellechea, Carlos: *See*—
Walls, John E.; Tellechea, Carlos; and Dhillon, Major S., 4,707,437, Cl. 430-523.000.
Temafa Textilmaschimenfabrik: *See*—
Morgner, Friedrich W.; and Hock, Franz, 4,706,337, Cl. 19-80.00R.
Tenhaven, Ulrich: *See*—
Warnke, Heinrich; Kaup, Friedel; Bersch, Bernhard; Mertinkat, Willi; and Tenhaven, Ulrich, 4,707,385, Cl. 427-374.100.
Terao, Kazuo; Kubo, Tsutomu; Hyakutake, Nobuo; Tachibana, Hidekiyo; Hama, Jun-ichi; Teshigawara, Touru; and Kajimoto, Masashi, to Fuji Xerox Co., Ltd. Electrostatic latent image developing method. 4,707,428, Cl. 430-102.000.
Terashita, Takaaki, to Fuji Photo Film Co., Ltd. Method for controlling exposure in color photographic printers. 4,707,118, Cl. 355-38.000.
Terashita, Takaaki, to Fuji Photo Film Co., Ltd. Photographic printer. 4,707,119, Cl. 355-38.000.
Tesar, Roland: *See*—
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Testa, Pierluigi, to Videocolor. Method and device for illuminating the face plate of a color television tube for formation of the screen. 4,707,093, Cl. 354-1.000.
Tetra Pak Developpement S.A.: *See*—
Reil, Wilhelm, 4,706,874, Cl. 222-526.000.
Teva Pharmaceutical Industries, Limited: *See*—
Keydar, Iafa, 4,707,438, Cl. 435-5.000.
Texas Alkyls, Inc.: *See*—
Malpass, Dennis B.; Fannin, Loyd W.; Crapo, Clark C.; and Triplett, Kelly B., 4,707,462, Cl. 502-153.000.
Texas Instruments Incorporated: *See*—
Ang, Saw T.; and Curran, Patrick A., 4,707,721, Cl. 357-54.000.
Havemann, Robert H., 4,706,378, Cl. 437-24.000.
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Spinelli, Thomas S.; and Deras, Edward J., 4,706,812, Cl. 206-332.000.
Thaker, Gautam H.: *See*—
Glenn, Raymond R.; Powshok, Andrew T.; Padgett, Robert S.; Uriarte, Pedro; Cain, Joseph B.; and Thaker, Gautam H., 4,707,832, Cl. 370-124.000.
Thalenfeld, David R., to Trion Industries, Inc. Shelf hook for merchandise and/or information display. 4,706,917, Cl. 248-205.100.
Theilacker, Klaus, to M.A.N.Roland Druckmaschinen AG. Web threading apparatus, particularly for threading of a rotary printing machine, or similar paper handling system. 4,706,862, Cl. 226-92.000.
Thelin, Anders G.: *See*—
Schachner, Herbert; Tippmann, Heinz; Lux, Benno; Stjernberg, Klas G.; and Thelin, Anders G., 4,707,384, Cl. 427-249.000.
Thermo Electric Instruments: *See*—
Richmond, James C., 4,707,148, Cl. 374-208.000.
Thermo King Corporation: *See*—
Howland, Leland L.; and Seshadri, Jayaram, 4,706,468, Cl. 62-199.000.
Thewlis, Duane E.: *See*—
Bishop, Marshall E.; and Thewlis, Duane E., 4,707,205, Cl. 156-110.100.
Thiede, Edwin C.: *See*—
Coulter, Thomas R.; Isaacson, Philip O.; and Thiede, Edwin C., 4,707,697, Cl. 342-25.000.
Thom, David; Swarthoff, Ton; and Maat, Jan, to Lever Brothers Company. Enzymatic detergent composition. 4,707,291, Cl. 252-174.120.
Thoma, Frank: *See*—
Eltze, Georg; Kluegl, Wendelin; and Thoma, Frank, 4,706,627, Cl. 123-365.000.
Thomas, Charles E.; and Yerazunis, William S., to General Electric Company. Detector to discriminate between tool break acoustic signatures and spiky noise. 4,707,687, Cl. 340-680.000.
Thomas, Charles E., to General Electric Company. Detection of tool breaks that cause slowly decreasing cutting noise. 4,707,688, Cl. 340-680.000.
Thomas, Griffith. Production of ingredients for detergents and soap powders from alkali phosphates. 4,707,344, Cl. 423-312.000.
Thomas, Gunter: *See*—
Meyer, Horst; Franckowiak, Gerhard; Rosentreter, Ulrich; Gross, Rainer; Thomas, Gunter; Schramm, Matthias; Kayser, Michael; Seuter, Friedel; Perzborn, Elisabeth; and Bechem, Martin, 4,707,479, Cl. 514-222.000.
Thomas, Haywood, Jr. Spinner apparatus and method. 4,706,530, Cl. 82-40.00R.
Thomas, Mammen; and Weinberg, Matthew, to Advanced Micro Devices, Inc. Method of making a planar structure containing MOS and bipolar transistors. 4,707,456, Cl. 437-59.000.
Thomas, Michael; Neumann, Peter; Wegerle, Dieter; and Krallmann, Reinhold, to BASF Aktiengesellschaft. Lightfastness of dyeings obtained with acid dyes or metal complex dyes on polyamides: treatment with copper hydroxamates. 4,707,161, Cl. 8-442.000.
Thompson, Darrell R., to Johnson & Johnson Products, Inc. Film dressing with fabric backing. 4,706,662, Cl. 128-155.000.
Thompson, David M. Baffled tank vent. 4,706,840, Cl. 220-373.000.
Thompson, Gregory L. Post puller. 4,706,935, Cl. 254-29.00R.
Thompson, Kevin D.; and Ballard, Gary W., to Carrier Corporation. Method of limiting motor power output. 4,707,646, Cl. 318-332.000.
Thompson, Mark E., to Du Pont de Nemours, E. I., and Company. Herbicidal ortho-heterocyclic pyrazolesulfonamides. 4,707,178, Cl. 71-90.000.
Thompson, Mark E., to Du Pont de Nemours, E. I., and Company. Herbicidal ortho-heterocyclic sulfonamides. 4,707,179, Cl. 71-90.000.
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Thomsen, Erik: *See*—
Thorsen, Niels P.; Jessen, Gilbert W.; Thomsen, Erik; and Sorensen, Jens R., 4,706,467, Cl. 62-139.000.
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de Virel, Dufresne, 4,707,736, Cl. 358-113.000.
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Thomson Grand Public: *See*—
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Thor Ceramics Limited: *See*—
Lee, Stephen J., 4,706,944, Cl. 266-272.000.
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Brooks, Steve M.; and May, David R., 4,707,589, Cl. 219-464.000.
Thorn, Richard P.; and Schwemmer, Leonard J. Motion control strut. 4,706,946, Cl. 267-292.000.
Thornton, Theodore W. Dispensing chain of loop lengths of dental floss or the like and method of forming same. 4,706,843, Cl. 221-48.000.
Thornton, William L.: *See*—
Lee, Ernie J.; and Thornton, William L., 4,706,765, Cl. 175-334.000.
Thorsen, Niels P.; Jessen, Gilbert W.; Thomsen, Erik; and Sorensen, Jens R., to Danfoss A/S. Control circuit for a refrigerating device. 4,706,467, Cl. 62-139.000.
Thorsrud, Agmund K., to Phillips Petroleum Company. Formation of laminated structures by selective dielectric heating of bonding film. 4,707,402, Cl. 428-328.000.
Tiedemann, Helmut: *See*—
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Tierney, Gordon L.: *See*—
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Tinder, David V., to United Technologies Automotive, Inc. Heat sink mounting arrangement for a semiconductor. 4,707,726, Cl. 357-81.000.
Tinley, Charles W.: *See*—
Suppinger, Albert V.; and Tinley, Charles W., 4,706,382, Cl. 29-879.000.
Tinnerino, Natale F.: *See*—
Labinger, Richard L.; Tinnerino, Natale F.; and Bryant, Timothy E., 4,707,734, Cl. 358-106.000.

Tippmann, Heinz: *See—*
Schachner, Herbert; Tippmann, Heinz; Lux, Benno; Stjernberg, Klas G.; and Thelin, Anders G., 4,707,384, Cl. 427-249.000.
Titcombe, Ian R. A.; and Strange, Ian A., to Raychem Limited. Electrical crimp connection. 4,707,366, Cl. 174-78.000.
Tobac Curing Systems Limited: *See—*
Watmough, Robert R.; and Timmins, David H., 4,706,447, Cl. 56-328.00R.
Tobergte, Konrad: *See—*
Conrad, Horst; Tobergte, Konrad; and Schulze, Rainer, 4,707,563, Cl. 174-50.000.
Toellner, Robert L.; and Copland, George V., to Halliburton Company. Method and apparatus for positioning a satellite antenna from a remote well logging location. 4,707,699, Cl. 342-352.000.
Tohoku Metal Industries Ltd.: *See—*
Honma, Toshio; Nishida, Minoru; and Yamauchi, Kiyoshi, 4,707,196, Cl. 148-12.70N.
Toibana, Yasuo: *See—*
Ebata, Yoshihiro; Hayami, Ryozo; Tamari, Nobuyuki; Toibana, Yasuo; and Kinoshita, Makoto, 4,707,416, Cl. 428-627.000.
Toida, Akikazu; Iwata, Satoshi; Takahashi, Fumio; and Mimura, Takanobu, to Shinko Electric Co., Ltd. Method of performing thermal multicolor printing. 4,707,703, Cl. 346-1.100.
Tokumitsu, Jun; and Sakata, Hajime, to Canon Kabushiki Kaisha. Method and apparatus for image conversion with multiple exposures for filtering. 4,707,743, Cl. 358-213.130.
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Tokura, Go: *See—*
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Tokyo Juki Industrial Co., Ltd.: *See—*
Shiomi, Kengo, 4,706,587, Cl. 112-237.000.
Tsukioka, Takashi, 4,706,589, Cl. 112-302.000.
Tokyo Keiki Company Limited: *See—*
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Tokyo Sanyo Electric Co., Ltd.: *See—*
Tanaka, Kanji; and Arai, Masashi, 4,707,856, Cl. 381-15.000.
Tokyo Shibaura Denki Kabushiki Kaisha: *See—*
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Yamasaki, Hiroshi, 4,707,815, Cl. 369-33.000.
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Tominaga, Yoshiharu, to Mitsubishi Denki Kabushiki Kaisha. Tandem rolling control system. 4,706,479, Cl. 72-8.000.
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Tomita, Satoru: *See—*
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Tomite, Tosio; Tani, Tatsuhiro; and Kobayashi, Hidemitsu, to Hitachi, Ltd. Magnetic cover member for magnetic poles of DC motor. 4,707,630, Cl. 310-154.000.
Tone, Junsuke: *See—*
Celmer, Walter D.; Cullen, Walter P.; Maeda, Hiroshi; Ruddock, John C.; and Tone, Junsuke, 4,707,493, Cl. 514-460.000.
Topholm, Jan, to Topholm & Westermann ApS. In-the-ear-canal hearing aid. 4,706,778, Cl. 181-135.000.
Topholm & Westermann ApS: *See—*
Topholm, Jan, 4,706,778, Cl. 181-135.000.
Toray Industries, Inc.: *See—*
Nagayama, Takashi; Otani, Mitsunobu; and Date, Tamotsu, 4,707,260, Cl. 210-386.000.
Toray Silicone Co., Ltd.: *See—*
Shirahata, Akihiko, 4,707,531, Cl. 528-12.000.
Torgardh, Ralph, to AB Volvo. Coupling arrangement for pressurized medium lines. 4,707,000, Cl. 285-305.000.
Torres, Manuel. Reel stand. 4,706,905, Cl. 242-68.400.
Tousek, Emil J.: *See—*
Kovit, Sheldon L.; Tousek, Emil J.; and Douglas, Larry D., 4,707,041, Cl. 439-131.000.
Towery, Donald R., to Burlington Industries, Inc. Thickening of water-coagulable solvent coating solutions. 4,707,400, Cl. 428-260.000.
Toyama, Takashi; Ohno, Masashi; Ishii, Kiminori; Yamamoto, Shosaku; and Kakinuma, Kazuo, to Nippon Oil and Fats Co., Ltd.; and Nissan Motor Co., Ltd. Method for finish coating on polyurethane formed articles. 4,707,381, Cl. 427-407.100.
Toyo Soda Manufacturing Co., Ltd.: *See—*
Mori, Takashi; Fukuda, Kenichi; and Kurauchi, Yasuhiro, 4,707,234, Cl. 204-182.300.
Toyo Tire & Rubber Co., Ltd.: *See—*
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Toyoda Gosei Co., Ltd.: *See—*
Koizumi, Junji; Sasaki, Kouji; and Naito, Junichiro, 4,707,528, Cl. 525-432.000.
Toyoda Koki Kabushiki Kaisha: *See—*
Okada, Hiroshi; Tsujiuchi, Toshio; and Ogasawara, Tadashi, 4,706,415, Cl. 51-165.00R.
Toyoshima, Shuji: *See—*
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TPV Energy Systems, Inc.: *See—*
Hottel, Hoyt C.; Nelson, Robert E.; and Parent, C. Robert, 4,707,560, Cl. 136-253.000.
Tracer Technologies, Inc.: *See—*
Ajami, Alfred M., 4,707,230, Cl. 204-131.000.
Travis, Alan J. B., to United Kingdom Atomic Energy Authority. Laser control system. 4,707,836, Cl. 372-29.000.
Treadwell Corporation: *See—*
Rubak, Irving L., 4,707,228, Cl. 204-128.000.
Trebilcock, Terry N.: *See—*
Epel, Joseph N.; Morse, John J., III; and Trebilcock, Terry N., 4,707,317, Cl. 264-136.000.
Trepus, George E., Jr.; Matin, Barry D.; and Rider, Preston L., to Boeing Company, The. Method of making a fiber reinforced product. 4,707,206, Cl. 156-187.000.
Trimble, Russell L.: *See—*
Snook, James A.; Nelson, Thomas W.; Wyble, Marilyn S.; and Trimble, Russell L., 4,706,664, Cl. 128-204.230.
Trion Industries, Inc.: *See—*
Thalenfeld, David R., 4,706,917, Cl. 248-205.100.
Tripathy, Sukant K.: *See—*
Druy, Mark A.; Tripathy, Sukant K.; and Rubner, Michael F., 4,707,527, Cl. 525-417.000.
Triplett, Kelly B.: *See—*
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TriStar Sports Inc.: *See—*
Meatto, Franklin D., 4,706,985, Cl. 280-610.000.
Triumph-Adler A.G.: *See—*
Burkhardt, Gottfried, 4,707,578, Cl. 200-159.00A.
Trombley, Douglas E., to General Motors Corporation. Engine combustion control responsive to location and magnitude of peak combustion pressure. 4,706,628, Cl. 123-425.000.
Trout, Torence J., to Du Pont de Nemours, E. I., and Company. Metallic soap as adjuvant for electrostatic liquid developer. 4,707,429, Cl. 430-115.000.
Truskalo, Walter, to RCA Corporation. Dynamic focus voltage with phase compensated adjustment. 4,707,639, Cl. 315-382.000.
TRW Inc.: *See—*
Hammerle, Frederick A.; Allen, Philip M.; Geddes, Richard; and Malone, Gary R., 4,706,868, Cl. 227-149.000.
Stokes, Robert B.; Yen, Kuo-Hsiung; Lau, Kei-Fung; Kagiwada, Reynold S.; and Delaney, Michael J., 4,707,631, Cl. 310-313.00A.
Tsang, Joseph C.; Ghezzo, Mario; and Fuller, Robert T., to General Electric Company. Method of fabricating a twin tub CMOS device. 4,707,455, Cl. 437-57.000.
Tsilibes, George N., to Eastman Kodak Company. Image recording apparatus in which exposure levels are a function of image contents. 4,707,709, Cl. 346-108.000.
Tsubata, Hideo: *See—*
Takahashi, Fumitaka; Kimura, Yoshihiko; Tsubata, Hideo; Ohji, Nobuaki; and Sashida, Kiyoshi, 4,707,057, Cl. 350-96.120.
Tsuboi, Kunio: *See—*
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Tsuchida, Shin; and Ito, Hideo, to Sumitomo Light Metal Industries, Ltd. Aluminum alloy sheet for containers excellent in corrosion resistance and method of producing same. 4,707,195, Cl. 148-11.50A.
Tsuchiya, Yukio: *See—*
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Tsuchiya, Yutaka: *See—*
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Tsuda, Kenji; and Namikoshi, Hajime, to Daicel Chemical Industries, Ltd. Mortar admixture. 4,707,187, Cl. 106-93.000.
Tsuda, Kenji; Matsumoto, Nobuyoshi; and Tsukagawa, Masahide, to Daicel Chemical Industries, Ltd. Cement composition for underwater concreting. 4,707,188, Cl. 106-93.000.
Tsuge, Itaru, Sachie Tsuge, heirs: *See—*
Takemae, Yoshihiro; Nakano, Tomio; Tatematsu, Takeo; Ogawa, Junji; Horii, Takashi; Fujii, Yasuhiro; Nakano, Masao; and Tsuge, Norihisa, deceased, 4,707,806, Cl. 365-96.000.
Tsuge, Norihisa, deceased: *See—*
Takemae, Yoshihiro; Nakano, Tomio; Tatematsu, Takeo; Ogawa, Junji; Horii, Takashi; Fujii, Yasuhiro; Nakano, Masao; and Tsuge, Norihisa, deceased, 4,707,806, Cl. 365-96.000.
Tsujiuchi, Toshio: *See—*
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Tsukagawa, Masahide: *See—*
Tsuda, Kenji; Matsumoto, Nobuyoshi; and Tsukagawa, Masahide, 4,707,188, Cl. 106-93.000.
Tsukamoto, Katsuhiro: *See—*
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Tsukioka, Takashi, to Tokyo Juki Industrial Co., Ltd. Needle thread guiding apparatus. 4,706,589, Cl. 112-302.000.

Tsunekawa, Masaru; Naito, Yoshihiro; Hyodo, Masaya; and Hayashi, Tatsuya, to Aisin Seiki Kabushiki Kaisha; and Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Apparatus for controlling working gas pressure in stirling engines. 4,706,457, Cl. 60-521.000.
Tsuyoshi, Toshiaki: *See*—
Yonezawa, Seiji; Ohtake, Masatoshi; Ito, Masaru; Tsuyoshi, Toshiaki; Ichino, Kazuo; and Nakagaki, Harushige, 4,707,816, Cl. 369-44.000.
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Tuithof, Hans H.: *See*—
Kunz, Dietmar W.; Tuithof, Hans H.; and Cuppen, Johannes J. M., 4,707,659, Cl. 324-309.000.
Tull, Herbert G., III: *See*—
Callens, E. Eugene, Jr.; Crowson, Leslie L., Jr.; Kobs, Robert P.; Tull, Herbert G., III; and Tahtouh, Joseph F., 4,706,360, Cl. 29-407.000.
Tung, Raymond T.: *See*—
Hensel, John C.; Levi, Anthony F. J.; and Tung, Raymond T., 4,707,197, Cl. 437-189.000.
Turiansky, Ladislav: *See*—
Blaskovits, Pavol; Lesnak, Stefan; Martisik, Aloiz; Zajac, Jan; Slavkovsky, Jan; Turiansky, Ladislav; and Levius, Rudolf, 4,707,581, Cl. 219-73.110.
Turner, Robert B.: *See*—
Mason, Stanley I., Jr.; Wolfe, Allan P.; and Turner, Robert B., 4,706,600, Cl. 118-31.500.
Tusting, Robert F., to Harbor Branch Oceanographic Institution Inc. Apparatus and method of submarine optical recording. 4,707,094, Cl. 354-64.000.
Tymon, Thomas M., to Armstrong World Industries, Inc. Flocced mineral materials and water-resistant articles made therefrom. 4,707,298, Cl. 252-378.00R.
Tyson, William H. Grill means. 4,706,643, Cl. 126-25.00R.
Ube Industries, Ltd.: *See*—
Kobayashi, Waichi; Usui, Koji; Hirosawa, Kozo; and Sadatani, Tetsuya, 4,707,270, Cl. 210-683.000.
Uchida, Atsushi: *See*—
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Uddo Mims International, Inc.: *See*—
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Ueda, Tatsuo: *See*—
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Uehara, Minoru: *See*—
Abe, Hiraku; Uehara, Minoru; and Aikawa, Chiaki, 4,707,062, Cl. 350-96.160.
Uehara, Yutaka: *See*—
Ijiichi, Masakatsu; Uehara, Yutaka; Sakaguchi, Masahiro; and Imamura, Shinichi, 4,706,607, Cl. 119-16.000.
Uesaka, Yasutaro: *See*—
Futamoto, Masaaki; Honda, Yukio; Uesaka, Yasutaro; and Yoshida, Kazuetsu, 4,707,756, Cl. 360-131.000.
Ueyama, Seiji; and Onoe, Hiroyasu, to General Company Limited. Heat-sensitive transferring recording medium. 4,707,395, Cl. 428-212.000.
Ueyama, Tsutomu, to Dainippon Screen Mfg. Co., Ltd. Film end holding device. 4,707,123, Cl. 355-73.000.
Ukai, Norio; and Iwasaki, Akira, to Honda Giken Kogyo Kabushiki Kaisha. Steering device for front and rear wheels. 4,706,977, Cl. 280-91.000.
Ullrich, Manfred: *See*—
Reutler, Herbert; and Ullrich, Manfred, 4,707,327, Cl. 376-294.000.
Ulmer, Harry E.: *See*—
Mathew, Chempolil T.; and Ulmer, Harry E., 4,707,294, Cl. 252-182.000.
Ulrich, Wolf-Rudiger: *See*—
Amschler, Hermann; and Ulrich, Wolf-Rudiger, 4,707,481, Cl. 514-247.000.
Flockerzi, Dieter; Klemm, Kurt; and Ulrich, Wolf-Rudiger, 4,707,486, Cl. 514-318.000.
ULS International Inc.: *See*—
Pole, Charles D., 4,706,854, Cl. 222-459.000.
Ultrasystems Defense and Space, Inc.: *See*—
Paciorek, Kazimiera J. L.; Kratzer, Reinhold H.; Harris, David H.; and Krone-Schmidt, Wilfried, 4,707,556, Cl. 556-403.000.
Ulug, Mehmet E., to General Electric Company. Token passing LAN using a plurality of tokens. 4,707,830, Cl. 370-89.000.
Umebayashi, Tetsuro: *See*—
Suzuki, Hirosuke; and Umebayashi, Tetsuro, 4,707,671, Cl. 333-1.000.
Umehara, Masakira, to Ricoh Co., Ltd. Optical information recording medium. 4,707,431, Cl. 430-271.000.
Umpleby, Jeffrey D.: *See*—
Bullen, David J.; and Umpleby, Jeffrey D., 4,707,517, Cl. 525-72.000.
Union Carbide Corporation: *See*—
Keogh, Michael J., 4,707,520, Cl. 525-245.000.
Koleske, Joseph V., 4,707,535, Cl. 528-110.000.
Lok, Brent M. T.; Marcus, Bonita K.; and Flanigen, Edith M., 4,707,345, Cl. 423-326.000.
Union Oil Company of California: *See*—
Block, Michael J., 4,707,299, Cl. 252-400.100.
Holm, LeRoy W., 4,706,752, Cl. 166-273.000.
Unisys Corp.: *See*—
Gyi, Ko K., 4,707,752, Cl. 360-99.000.
Unit Rig & Equipment Company: *See*—
Loeber, Frederick W.; Cummins, Nolan W.; Modglin, Rodger L.; and Greene, George O., 4,706,723, Cl. 152-410.000.
United Engineering Rolling Mills, Inc.: *See*—
Dittmar, Robert W.; and Schmiedberg, Winfried, 4,706,484, Cl. 72-225.000.
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Kennedy, Peter; and Ware, John O., 4,707,459, Cl. 501-90.000.
Travis, Alan J. B., 4,707,836, Cl. 372-29.000.
United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Brittanic Majesty's Government of the: *See*—
Gardiner, Robert W.; Viney, Brian W.; and Hughes, Garyth, 4,707,333, Cl. 420-590.000.
United Pharmaceuticals, Inc.: *See*—
Davis, William M., 4,707,480, Cl. 514-228.000.
U.S. Fire Control Corporation: *See*—
Johnson, Wilfred V., 4,706,758, Cl. 169-19.000.
U.S. Holding Co., Inc.: *See*—
Hoffman, Arthur J., III, 4,707,069, Cl. 350-96.210.
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Agriculture: *See*—
King, A. Douglas, Jr.; and Nassos-Stalder, Patricia S., 4,707,444, Cl. 435-26.000.
Air Force: *See*—
Cuevas, Jess A.; and Blackshire, Robert D., 4,706,909, Cl. 244-122.0AC.
Hailey, Samuel I.; and Alden, John W., 4,707,212, Cl. 156-361.000.
Mahefkey, Edward T., 4,706,740, Cl. 165-104.140.
Task, Harry L.; and Wyatt, Ivan S., 4,707,696, Cl. 340-954.000.
Army: *See*—
Dame, John B.; Williams, Jackie L.; McCutchan, Thomas F.; and Schneider, Imogene, 4,707,357, Cl. 424-88.000.
Peck, Carl C., 4,706,676, Cl. 128-632.000.
Perry, John S., 4,706,912, Cl. 244-158.00A.
Roberts, Thomas G.; Conrad, Raymond W.; and Honeycutt, Thomas E., 4,707,133, Cl. 356-320.000.
Sayles, David C., 4,707,199, Cl. 149-19.200.
Zollinger, Wendell D.; Boslego, John; Moran, Ellen; Brandt, Brenda; Collins, Hugh; Mandrell, Robert; Altieri, Patricia; and Berman, Sanford, 4,707,543, Cl. 530-402.000.
Commerce: *See*—
Vranish, John M.; Bunch, Wayne R.; and Johns, William L., 4,707,013, Cl. 294-119.100.
Energy: *See*—
Hawke, Ronald S., 4,706,542, Cl. 89-8.000.
Hoffert, William J., 4,707,668, Cl. 330-56.000.
Parkinson, William J., 4,706,581, Cl. 110-349.000.
Regan, Thomas O., 4,706,497, Cl. 73-295.000.
Richards, Powell; Mausner, Leonard F.; and Prach, Thomas F., 4,707,322, Cl. 376-194.000.
Yudow, Bernard D., 4,706,651, Cl. 126-451.000.
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Major, Eugene O., 4,707,448, Cl. 435-240.250.
McCutchan, Thomas F.; and Dame, John B., 4,707,445, Cl. 435-91.000.
Nelson, David; Biddison, William; Rubin, Laurence; Greene, Warner; Leonard, Warren; and Yarchoan, Robert, 4,707,443, Cl. 435-7.000.
Seto, Belinda P.; Coleman, William G., Jr.; and Gerety, Robert J., 4,707,439, Cl. 435-5.000.
Interior: *See*—
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National Aeronautics and Space Administration: *See*—
Walsh, Michael J.; Anders, John B.; and Hefner, Jerry N., 4,706,910, Cl. 244-130.000.
Wichorek, Gregory R., 4,706,387, Cl. 33-147.00D.
Navy: *See*—
Aklufi, Monti E., 4,707,217, Cl. 156-617.00R.
Bullat, David M., 4,706,550, Cl. 92-260.000.
Lundwall, Neal M.; and Herigstad, Donald, 4,706,568, Cl. 102-513.000.
U.S. Philips Corporation: *See*—
Bruno, Richard; and Van Luyt, Balthasar A. G., 4,707,729, Cl. 358-13.000.
Cuppen, Johannes J. M.; and Groen, Johannes P., 4,707,660, Cl. 324-309.000.
Cuppens, Roger; and Hartgring, Cornelis D., 4,707,807, Cl. 365-154.000.
Elliott, Kenneth F., 4,706,819, Cl. 211-41.000.
Field, Anthony J.; Heerah, Atma; and Mackereth, Thomas C., 4,707,742, Cl. 358-183.000.
Kemner, Rudolf; Kalmijn, Hilco T.; and Van Heelsbergen, Teunis R., 4,707,662, Cl. 324-318.000.
Kraakman, Hillebrand J. J., 4,707,072, Cl. 350-96.210.
Kunz, Dietmar W.; Tuithof, Hans H.; and Cuppen, Johannes J. M., 4,707,659, Cl. 324-309.000.
Mayer, Robert T., 4,707,854, Cl. 379-356.000.
Rosenthal, Manfred; and Roulaux, Jan, 4,707,714, Cl. 346-140.00R.

Tolksdorf, Wolfgang F. M.; Bartels, Inske E. H.; and Pross, Elke B., 4,707,058, Cl. 350-96.120.
Veendrick, Hendrikus J. M.; Van Zanten, Adrianus T.; and Pfennings, Leonardus C. M. G., 4,707,844, Cl. 377-58.000.
Verhagen, Johannes P. C. M., 4,707,821, Cl. 369-292.000.
Whight, Kenneth R., 4,707,719, Cl. 357-53.000.

U.S. Precision Lens, Inc.: *See—*
Betensky, Ellis I., 4,707,084, Cl. 350-432.000.

United Technologies Automotive, Inc.: *See—*
Tinder, David V., 4,707,726, Cl. 357-81.000.

United Technologies Corporation: *See—*
Cheo, Peter K.; and Gilden, Meyer, 4,707,060, Cl. 350-96.140.
Dempsey, Russell M.; Fragala, Anthony R.; LaConti, Anthony B.; and Enos, John F., 4,707,229, Cl. 204-129.000.
Hmelovsky, Michael W.; and Tedeschi, Rinaldo R., 4,707,791, Cl. 364-431.040.
Shuskus, Alexander J., 4,706,377, Cl. 437-24.000.

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Milo, Joseph V., 4,706,718, Cl. 141-86.000.

Universite de Caen: *See—*
Arraag, Jean-Michel; Garbarg, Monique; Lancelot, Jean-Charles; Lecomte, Jeanne-Marie; Robba, Max-Fernand; and Schwartz, Jean-Charles, 4,707,487, Cl. 514-326.000.

University of California, The Regents of the: *See—*
Brink, David L.; Merriman, Michael M.; and Mixon, David A., 4,706,903, Cl. 241-188.00R.
Fehn, John H.; Arakawa, Mitsuaki; and McCarten, Barry M., 4,707,664, Cl. 324-322.000.
Hoenninger, John C., III; and Crooks, Lawrence E., 4,707,661, Cl. 324-309.000.

University of Chicago, The: *See—*
Kieff, Elliott; Tanner, Jerome; Hummel, Mary; and Beisel, Christopher, 4,707,358, Cl. 424-89.000.

University of Illinois: *See—*
Morkoc, Hadis; and Fischer, Russ, 4,707,216, Cl. 156-610.000.

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Ryan, James W.; and Chung, Alfred, 4,707,490, Cl. 514-423.000.

University of Michigan, Regents of the: *See—*
Matthews, Larry S.; and Goldstein, Steven A., 4,706,659, Cl. 128-92.0VD.

University of North Carolina at Chapel Hill: *See—*
DiBianca, Frank A., 4,707,608, Cl. 250-389.000.

University of Toronto, Innovations Foundation: *See—*
Yen, Jui L.; and Wang, Rui, 4,707,841, Cl. 375-106.000.

Uno, Tetsuya: *See—*
Ishii, Kazuhiro; Uno, Tetsuya; Kato, Masaki; and Kobayashi, Masao, 4,707,460, Cl. 502-26.000.

UOP Inc.: *See—*
Goodman, Walter H., 4,707,190, Cl. 127-46.200.

Uozumi, Yoshiaki: *See—*
Asai, Masahiro; Mizushima, Toshio; Kawai, Toshiro; Akutsu, Shigemitsu; and Uozumi, Yoshiaki, 4,706,617, Cl. 123-65.0PE.

Urata, Susumu: *See—*
Nakamura, Toshio; Tamura, Tadashi; Kimura, Naomi; and Urata, Susumu, 4,706,555, Cl. 99-283.000.

Urbas, John C. Heat collector for the dryer section of a papermaking machine. 4,706,391, Cl. 34-114.000.

Uriarte, Pedro: *See—*
Glenn, Raymond R.; Powshok, Andrew T.; Padgett, Robert S.; Uriarte, Pedro; Cain, Joseph B.; and Thaker, Gautam H., 4,707,832, Cl. 370-124.000.

Urschel Laboratories, Incorporated: *See—*
Fischer, Robert R.; and Fischer, W. James, 4,706,524, Cl. 76-101.00A.

Urso, Charles L. Interdental cleaning and polishing tool. 4,706,695, Cl. 132-92.00R.

USM Corporation: *See—*
Borst, Willi; and Pfisterer, Reinhard, 4,706,852, Cl. 222-146.200.
Gilch, Heinz G.; and Haar, Wolfgang, 4,707,515, Cl. 524-506.000.
Schuurmans, Marinus E., 4,706,585, Cl. 112-121.270.

Usui, Koji: *See—*
Kobayashi, Waichi; Usui, Koji; Hirosawa, Kozo; and Sadatani, Tetsuya, 4,707,270, Cl. 210-683.000.

USX Engineers & Consultants, Inc.: *See—*
Ratliff, George D., Jr., 4,706,925, Cl. 249-162.000.

Utica Enterprises, Incorporated: *See—*
Dacey, Ernest A., Jr., 4,706,489, Cl. 72-450.000.

Uzee, Andre J.: *See—*
Stephens, Keith E.; and Uzee, Andre J., 4,707,522, Cl. 525-334.100.

V. Kann Rasmussen Industri A/S: *See—*
Nortoft, Soren B., 4,706,726, Cl. 160-168.00R.

Vail, Philip G., Jr. Swiveling wind scoop. 4,706,593, Cl. 114-211.000.

Vajna, Sandor; and Peuschel, Gerd, to Kali und Salz. Process for the production of potassium sulfate from potassium chloride by means of ion exchangers. 4,707,347, Cl. 423-552.000.

Valencia, Vance I.: *See—*
Chu, Edmond Y.; and Valencia, Vance I., 4,707,619, Cl. 307-106.000.

Valenzky, David; and Markhart, Gary T., to Farrell Corporation. Control system and method for continuous mixer with moving surface discharge device. 4,707,139, Cl. 366-77.000.

Van Aken, Jan, to 501 Hecopharma B.V. Device for taking a picture of a jaw part. 4,707,847, Cl. 378-170.000.

van den Broek, William A., to KDI Sylvan Pools, Inc. Automatic rim flow water level control system for gutters. 4,706,309, Cl. 4-508.000.

van den Haak, Rob. Anchor. 4,706,595, Cl. 114-301.000.

van den Honert, Christopher: *See—*
Stypulkowski, Paul H.; and van den Honert, Christopher, 4,706,682, Cl. 128-642.000.

Van Duyn, Paul D., to General Motors Corporation. Vehicle headlamp assembly. 4,707,769, Cl. 362-66.000.

Van Duyn, Paul D., to General Motors Corporation. Support shoe for a vehicle headlamp assembly. 4,707,770, Cl. 362-66.000.

Van Duyn, Paul D.; McMahan, David R.; Geddie, John D.; and Nagengast, William E., Jr., to General Motors Corporation. Support shoe for a vehicle headlamp assembly. 4,707,771, Cl. 362-66.000.

Van Gompel, Paul T.; and Suprise, Jody D., to Kimberly-Clark Corporation. Disposable bib with an elasticized neckband. 4,706,303, Cl. 2-49.00R.

Van Heelsbergen, Teunis R.: *See—*
Kemner, Rudolf; Kalmijn, Hilco T.; and Van Heelsbergen, Teunis R., 4,707,662, Cl. 324-318.000.

Van Luyt, Balthasar A. G.: *See—*
Bruno, Richard; and Van Luyt, Balthasar A. G., 4,707,729, Cl. 358-13.000.

Vanmark Corporation: *See—*
Wallace, Joseph E.; and Shaffer, Robert L., 4,706,556, Cl. 99-330.000.

Van Steenwyk, Donald H., to Applied Technologies Associates. Borehole initial alignment and change determination. 4,706,388, Cl. 33-304.000.

Van Zandt, Willie L. Portable adjustable mirror assembly. 4,707,087, Cl. 350-638.000.

Van Zanten, Adrianus T.: *See—*
Veendrick, Hendrikus J. M.; Van Zanten, Adrianus T.; and Pfennings, Leonardus C. M. G., 4,707,844, Cl. 377-58.000.

Varlet, Marc F. Latch assembly. 4,707,004, Cl. 292-91.000.

Varma, Ravi K.; Ciosek, Carl P.; and Gordon, Eric M., to E. R. Squibb & Sons, Inc. 7-oxabicyclo(2.2.1)heptane compounds useful in the treatment of inflammation. 4,707,494, Cl. 514-469.000.

Vavasseur, Paul: *See—*
Charvin, Philippe; and Vavasseur, Paul, 4,706,596, Cl. 114-312.000.

Veendrick, Hendrikus J. M.; Van Zanten, Adrianus T.; and Pfennings, Leonardus C. M. G., to U.S. Philips Corporation. Integrated circuit having reduced clock cross-talk. 4,707,844, Cl. 377-58.000.

Vellinga, Sjoerd H. J., to Paques B.V. Apparatus for purifying water. 4,707,254, Cl. 210-199.000.

Velvac, Inc.: *See—*
Grajek, Leonard A., 4,706,841, Cl. 220-375.000.

Venkateswaran, Viswanathan: *See—*
Kim, Jonathan J.; and Venkateswaran, Viswanathan, 4,707,583, Cl. 219-121.00P.

Verges, Jaime M., to Mikalor, S.A. Clamping collar. 4,706,346, Cl. 24-274.00R.

Verhagen, Johannes P. C. M., to U.S. Philips Corporation. Disc holder for a rigid audio and/or video disc. 4,707,821, Cl. 369-292.000.

Verpoort, Clemeens: *See—*
Meyer, Gundolf; and Verpoort, Clemeens, 4,706,361, Cl. 29-423.000.

Vessey, John R., to Excel Corporation. Conveyor roller with torque overload release means. 4,706,801, Cl. 198-781.000.

Vetter, Heinz, to Rohm GmbH. Method for making hollow multilayer multiple-wall synthetic resin panels. 4,707,393, Cl. 428-178.000.

Vetter, Karl-Heinz: *See—*
Rohr, Gustav; and Vetter, Karl-Heinz, 4,707,643, Cl. 318-77.000.

Victor Company of Japan, Ltd.: *See—*
Moritizumi, Hirokazu; Horiguchi, Akira; and Sasaki, Isao, 4,707,403, Cl. 428-328.000.
Shinyagaito, Tatsuya; Kuramoto, Terumasa; Machida, Toyotaka; Saito, Kikuji; Shichijo, Shunichi; Yamagishi, Tooru; Ishii, Kazuyoshi; Kobayashi, Yoshinao; and Hirata, Atsumi, 4,707,733, Cl. 358-342.000.

Videocolor: *See—*
Testa, Pierluigi, 4,707,093, Cl. 354-1.000.

Viertel, Lothar: *See—*
Ebert, Charles; Krehl, Hermann; Viertel, Lothar; Hilbert, Bernard; and Walter, Rudiger, 4,707,019, Cl. 296-97.00K.

Villalon, Yannick: *See—*
Ferre, Alain; and Villalon, Yannick, 4,707,738, Cl. 358-135.000.

Vincent, Yvon M. Roller skate. 4,706,974, Cl. 280-11.115.

Viney, Brian W.: *See—*
Gardiner, Robert W.; Viney, Brian W.; and Hughes, Garyth, 4,707,333, Cl. 420-590.000.

Visser, John G. Product display and take-out cart. 4,706,823, Cl. 211-133.000.

Vivace, Robert T., to General Motors Corporation. Support and seal assembly. 4,706,453, Cl. 60-271.000.

Voegeli, Ronald C. Display rack. 4,707,038, Cl. 312-257.0SM.

Vogel, Arnold, to Sandoz Ltd. 4-(2,1,3-benzoxadiazol and benzothiadiazol-4-4L)-1,4-dihydropyridine-3,5-dicarboxylic acid esters useful as antihypertensives. 4,707,482, Cl. 514-253.000.

Vogel, Eva M.: *See—*
Johnson, David W., Jr.; MacChesney, John B.; Rabinovich, Eliezer M.; and Vogel, Eva M., 4,707,174, Cl. 65-18.100.

Vogel, Gerald J.; Kearney, Donald T.; Akpinar, Belkis K.; and Moorman, Charles T., to General Foods Corporation. Process of steaming and percolating coffee. 4,707,368, Cl. 426-386.000.

Vogel, Roger F.: *See—*
Mitchell, Bruce R.; and Vogel, Roger F., 4,707,461, Cl. 502-64.000.

Vogt, Siegfried; and Schulze, Wolfram, to Kochs Adler AG. Automatic sewing machine having a post-arranged reel. 4,706,586, Cl. 112-121.290.

Voltaix, Inc.: *See*—
de Neufville, John P.; Rajoria, Dalbir; and Ovshinsky, Stanford R., 4,707,422, Cl. 429-48.000.

Von Roll AG: *See*—
Kistler, Francois, 4,707,272, Cl. 210-709.000.

von Broock, Ulrich; and Hawener, Jurgen, to Dr. Ing.h.c.F. Porsche Aktiengesellschaft. Propulsion unit suspension for vehicles, especially for propeller driven aircrafts. 4,706,901, Cl. 244-54.000.

von der Decken, Claus-Benedict: *See*—
Iniotakis, Nicolaos; von der Decken, Claus-Benedict; Hecker, Rudolf; Frohling, Werner; and Schulten, Rudolf, 4,707,342, Cl. 423-248.000.

Von Holdt, John W. Molded pull fitting. 4,706,838, Cl. 220-270.000.

Von Holdt, John W. Safety mold lift lock. 4,706,926, Cl. 249-169.000.

von Ondarza, Leon, to H. Krantz GmbH & Co. Process for the treatment of knitware. 4,706,315, Cl. 8-155.100.

Voss, David L.; DeCamp, Howard S.; and Culp, Gordon W., to Sierracin Corporation. Electro conductive film system for aircraft windows. 4,707,586, Cl. 219-203.000.

Voss, Gunther M.; Glasel, Volker L; Gruber, Peter; and Bubeck, Walter, to Dr. Karl Thomae GmbH. Dotting of molding tools with droplets. 4,707,309, Cl. 264-12.000.

Voss, Robert L.: *See*—
Baldino, Micheal; Voss, Robert L.; and Hladik, Larry L., 4,706,554, Cl. 98-121.200.

Vowell, Kennison L., to Rockwell International Corporation. Duct closure. 4,707,323, Cl. 376-203.000.

Vranish, John M.; Bunch, Wayne R.; and Johns, William L., to United States of America, Commerce. Split rail parallel gripper. 4,707,013, Cl. 294-119.100.

Vyskumny ustav zvaracsky: *See*—
Blaskovits, Pavol; Lesnak, Stefan; Martisik, Aloiz; Zajac, Jan; Slavkovsky, Jan; Turiansky, Ladislav; and Levius, Rudolf, 4,707,581, Cl. 219-73.110.

Vysoka skola strojni a textilni: *See*—
Krejcir, Oldrich; Zajic, Bohuslav; and Saroun, Pavel, 4,706,923, Cl. 248-638.000.

W. L. Gore & Associates, Inc.: *See*—
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Wachtler, Andreas: *See*—
Pohl, Ludwig; Scheuble, Bernhard; Wachtler, Andreas; Hittich, Reinhard; and Fuss, Peter, 4,707,295, Cl. 252-299.620.

Wada, Hiroyuki: *See*—
Murata, Yasuzo; Yokoyama, Takeo; Wada, Hiroyuki; and Sakurai, Masaaki, 4,707,593, Cl. 235-487.000.

Wade, David A.: *See*—
Zutell, Stephen W.; Wade, David A.; and Hanson, James V., 4,706,818, Cl. 209-636.000.

Wagner, Daniel B.; and Baffi, Robert A., to Becton Dickinson and Company. Vesicle including a metal marker for use in an assay. 4,707,453, Cl. 436-501.000.

Wagner, Steven D., to Ampex Corporation. Frequency measurement circuit. 4,707,653, Cl. 324-78.00R.

Wagoner, Roy J., to GTE Communication Systems. Fiber optic cable splicing apparatus and method. 4,707,070, Cl. 350-96.210.

Wakamiya, Koichi, to Nippon Kogaku K. K. Albada finder. 4,707,098, Cl. 354-219.000.

Waketa, Hideharu: *See*—
Kasai, Shin; Waketa, Hideharu; Kato, Keiichi; and Kawaguchi, Yutaka, 4,707,565, Cl. 174-68.500.

Walatka, Vernon V.: *See*—
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Walch, Wolfgang: *See*—
Newiger, Winfried; Walch, Wolfgang; Rach, Harry; and Kiessling, Michael, 4,707,116, Cl. 355-30.000.

Waldenrath, Werner: *See*—
Wank, Joachim; Waldenrath, Werner; Schmitz, Heinz; and Pakulat, Gunter, 4,707,396, Cl. 428-216.000.

Walkowiak, Michael; Nehren, Klaus; Podszun, Wolfgang; and Finger, Werner, to Bayer Aktiengesellschaft. Porous fillers in polymerizable compositions. 4,707,504, Cl. 523-109.000.

Wallace, Joseph E.; and Shaffer, Robert L., to Vanmark Corporation. Potato chip manufacturing machine. 4,706,556, Cl. 99-330.000.

Wallow, Peter; and Bisping, Bernhard, to Rheinmetall GmbH. Armor breaking projectile. 4,706,569, Cl. 102-518.000.

Walls, Gary C. Self-seating valve with compressive release. 4,707,279, Cl. 251-339.000.

Walls, John E.; Tellechea, Carlos; and Dhillon, Major S., to Hoechst Celanese Corporation. Radiation-polymerizable composition and element containing a photopolymer composition. 4,707,437, Cl. 430-523.000.

Walsh, Michael J.; Anders, John B.; and Hefner, Jerry N., to United States of America, National Aeronautics and Space Administration. Combined riblet and lebu drag reduction system. 4,706,910, Cl. 244-130.000.

Walsh, Peter J., to Duro-Test Corporation. Energy-efficient lamp. 4,707,632, Cl. 313-112.000.

Walsh, William A. G.: *See*—
Weir, Donald A., deceased; Walsh, William A. G.; and Slatter, Richard C., 4,707,831, Cl. 370-94.000.

Walter, Rudiger: *See*—
Ebert, Charles; Krehl, Hermann; Viertel, Lothar; Hilbert, Bernard; and Walter, Rudiger, 4,707,019, Cl. 296-97.00K.

Walters, Bryon L.: *See*—
Ney, Reuben E.; and Walters, Bryon L., 4,707,045, Cl. 439-588.000.

Walthall, B. Kenneth, to Molded Parts Specialists. Steering arm for outboard motors. 4,706,592, Cl. 114-153.000.

Wampler, D. Eugene: *See*—
Friedman, Arthur; Lehman, E. Dale; McAleer, William J.; Schaefer, Ted F.; Scolnick, Edward M.; and Wampler, D. Eugene, 4,707,542, Cl. 530-371.000.

Wanamaker, Joseph L.: *See*—
Downs, Robert C.; Nitz, Larry T.; and Wanamaker, Joseph L., 4,707,789, Cl. 364-424.100.

Wang, Chun S.; Liao, Zeng-kun; and Steele, Dennis L., to Dow Chemical Company, The. Monomers and oligomers containing a plurality of vinylbenzyl ether groups, method for their preparation and cured products therefrom. 4,707,558, Cl. 568-23.000.

Wang, Danny I.: *See*—
Creed, Sherman H.; and Wang, Danny I., 4,706,494, Cl. 73-49.300.

Wang, Richard H. S.: *See*—
Pruett, Wayne P.; Wang, Richard H. S.; Hilbert, Samuel D.; and Weaver, Max A., 4,707,537, Cl. 528-288.000.

Wang, Rui: *See*—
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Wang, Shih-Fu. Key selector device. 4,706,803, Cl. 206-37.100.

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Wasko, George J. Rotary converter having dual-winding rotor. 4,707,629, Cl. 310-129.000.

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Savit, Carl H.; Boone, Rhonda; and Doyle, Mark, 4,707,787, Cl. 364-420.000.
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Baker, Donal E.; and Beg, Mirza A., 4,707,142, Cl. 368-46.000.
Cho, Gyu-Hycong, 4,707,777, Cl. 363-138.000.
Ferrari, Harry M., 4,707,330, Cl. 376-457.000.
Freeman, Thomas R., 4,707,329, Cl. 376-449.000.
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Kennon, Jerry M.; and Hayden, Leland E., 4,707,679, Cl. 340-310.00A.
Nugent, John L.; Rush, George C.; and Matthews, Norman G., 4,707,665, Cl. 328-14.000.
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Schmidt, Albert L.; Sherwin, Gary W.; Blackham, Kenneth K.; and Johnson, John L., 4,706,679, Cl. 128-639.000.
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Storrick, Gary D., 4,707,324, Cl. 376-215.000.
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Whatley, William G. Hunting device. 4,706,858, Cl. 224-184.000.
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White, Kevin M.; and Beck, Harold K., to Halliburton Company. Downhole inflatable packer pump and testing apparatus. 4,706,746, Cl. 166-106.000.
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Whited, Gary L. High voltage protection barrier. 4,707,562, Cl. 174-5.00R.
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Williams, David T.: *See*—
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Williams, Howard M., Jr., to Hubbell Incorporated. Electrical box with laterally open polygonal bore. 4,706,831, Cl. 220-3.200.
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Wilson, Jerry F., to Manville Corporation. Sleeve-type carrier handle. 4,706,876, Cl. 229-52.00B.
Wilson, John F.; Gjertsen, Robert K.; and Mayers, Joseph B., to Westinghouse Electric Corp. Arrangement and method for attaching and reattaching a top nozzle in a reconstitutable nuclear fuel assembly. 4,707,326, Cl. 376-261.000.
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Wilson, Wilfred W., to Dow Chemical Company, The. Microencapsulated insecticidal bait formulations as fumigants. 4,707,355, Cl. 424-84.000.
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Wu, Mu-Yen M.; Ball, Lawrence E.; and Coffey, Gerald P., to Standard Oil Company, The. Polyamide preparation with pentaamine cobalt (III) complex catalyst. 4,707,538, Cl. 528-315.000.
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Hartmann, George C., 4,707,112, Cl. 355-10.000.
Lama, William L.; and Loce, Robert P., 4,707,122, Cl. 355-71.000.
Scarlata, Richard F., 4,707,215, Cl. 156-578.000.
Shinbrot, Troy; and Kuo, Youti, 4,707,113, Cl. 355-14.0SH.
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Xi, La. Pedal mechanism for a bicycle having the pedal crank radially movable therein. 4,706,516, Cl. 74-594.100.
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Yamada, Hiroshi; Iioka, Michihiro; Sugano, Akira; Takita, Atsushi; Nigawara, Seiitsu; and Fukai, Masayuki, to Hitachi, Ltd. Controller for heat power plant. 4,707,778, Cl. 364-132.000.
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Yanagisawa, Kazumasa, to Hitachi, Ltd. Semiconductor integrated circuit device formed with a CMOS circuit and a boatstrap capacitor. 4,707,625, Cl. 307-578.000.
Yang, Ching-Wen: *See*—
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Yingst, Thomas E.; and Weis, Fredrick A., to Mile High Equipment Company. Under the counter ice making machine. 4,706,466, Cl. 62-138.000.
Yokoyama, Takeo: *See*—
Murata, Yasuzo; Yokoyama, Takeo; Wada, Hiroyuki; and Sakurai, Masaaki, 4,707,593, Cl. 235-487.000.
Yoneda, Norihiko; Fukuhara, Tsuyoshi; and Nozawa, Seiichi, to Mitsubishi Chemical Industries Limited. Catalytic preparation of aromatic polyketone from phosgene and aromatic ether or sulfide. 4,707,536, Cl. 528-198.000.
Yonezawa, Seiji; Ohtake, Masatoshi; Ito, Masaru; Tsuyoshi, Toshiaki; Ichino, Kazuo; and Nakagaki, Harushige, to Hitachi, Ltd. Method

and apparatus for composite wobbled and push-pull tracking servo system. 4,707,816, Cl. 369-44.000.

Yoshida, Fumio: *See*—
Inoue, Manabu; Fujino, Akihiko; Hirano, Masayasu; Nakai, Masaaki; and Yoshida, Fumio, 4,707,104, Cl. 354-412.000.

Yoshida, Kazuetsu: *See*—
Futamoto, Masaaki; Honda, Yukio; Uesaka, Yasutaro; and Yoshida, Kazuetsu, 4,707,756, Cl. 360-131.000.

Yoshida, Kiyoshi, to Nippon Gakki Seizo Kabushiki Kaisha. Electronic musical instrument with automatic musical accompaniment playing system. 4,706,538, Cl. 84-1.030.

Yoshida Kogyo, K. K.: *See*—
Murasaki, Ryuichi, 4,706,715, Cl. 139-46.000.
Tanaka, Akira; and Watanabe, Hirokazu, 4,706,344, Cl. 24-94.000.

Yoshida, Kunihiko; Koshi, Kenichi; and Ichiki, Nobuhiko, to Hitachi Construction Machinery Co., Ltd. Fluid control valve apparatus. 4,706,932, Cl. 251-31.000.

Yoshida, Masaru: *See*—
Ogura, Takashi; Tanaka, Koichi; Taniguchi, Koji; Yoshida, Masaru; and Mikami, Akiyoshi, 4,707,419, Cl. 428-690.000.

Yoshimitsu, Toshio, to Kabushiki Kaisha Komatsu Seisakusho. Internal combustion engine cylinder liner coatings. 4,706,616, Cl. 123-41.840.

Yoshimura, Shohei; Fujimura, Shigeki; and Sakamoto, Itaru, to Japan Styrene Paper Corporation. Multi-conductor cable. 4,707,569, Cl. 174-116.000.

Yoshino, Hiroshi; Tsuchiya, Yutaka; Kaneko, Takeru; Nakazawa, Takahiro; Ikeda, Masuhiro; Araki, Shin; Yamatsu, Kiyomi; Tachibana, Shinro; and Arakawa, Yoshihiro, to Eisai Co., Ltd. Polypeptide. 4,707,468, Cl. 514-16.000.

Yoshio, Junichi, to Pioneer Electronic Corporation. Method of generating tracking servo signal for optical disc playback apparatus. 4,707,817, Cl. 369-46.000.

Yoshioka, Noriaki: *See*—
Ikeyama, Norio; Yoshioka, Noriaki; Tamaru, Shusaku; and Ichinose, Hisashi, 4,707,261, Cl. 210-433.200.

Young, David A., to Young Rubber Company. Permanent non-removable insulating type concrete wall forming structure. 4,706,429, Cl. 52-309.120.

Young, Michael C. Offset wheel bracket assembly. 4,706,938, Cl. 254-133.00R.

Young, Orville R. Pneumatic spring support system. 4,706,988, Cl. 280-676.000.

Young Rubber Company: *See*—
Young, David A., 4,706,429, Cl. 52-309.120.

Yu, Wen C. Paper clip. 4,706,342, Cl. 24-67.900.

Yudow, Bernard D., to United States of America, Energy. Solar solids reactor. 4,706,651, Cl. 126-451.000.

Yuki Gosei Kogyo Co., Ltd.: *See*—
Nagai, Yoichiro; Watanabe, Hamao; and Akutsu, Yoshinori, 4,707,557, Cl. 556-430.000.

Yukimoto, Kougi: *See*—
Mikami, Mitsugu; Yukimoto, Kougi; and Ishii, Jun, 4,706,795, Cl. 194-317.000.

Yundt, George B.: *See*—
Sharp, Gordon P.; Curtiss, William P.; and Yundt, George B., 4,706,553, Cl. 98-115.300.

Zahringer, H. David: *See*—
Kohls, Mitchell L.; Smith, Loren G.; and Zahringer, H. David, 4,706,821, Cl. 211-593.000.

Zajac, Jan: *See*—
Blaskovits, Pavol; Lesnak, Stefan; Martisik, Aloiz; Zajac, Jan; Slavkovsky, Jan; Turiansky, Ladislav; and Levius, Rudolf, 4,707,581, Cl. 219-73.110.

Zajic, Bohuslav: *See*—
Krejcir, Oldrich; Zajic, Bohuslav; and Saroun, Pavel, 4,706,923, Cl. 248-638.000.

Zandel, Adam: *See*—
Zeitlin, Alexander; Brayman, Jack; and Zandel, Adam, 4,706,490, Cl. 72-455.000.

Zeilinger, Alan, to Magic American Chemical Corporation. Sealing system. 4,706,427, Cl. 52-288.000.

Zeitlin, Alexander; Brayman, Jack; and Zandel, Adam, to Press Technology Corp. Forging press with yoke design for attaching tie-rods to crossheads. 4,706,490, Cl. 72-455.000.

Zenith Electronics Corporation: *See*—
Bione, Angelo A.; and Sirazi, Semir, 4,707,827, Cl. 370-85.000.

Zeria Shinyaku Kogyo Kabushiki Kaisha: *See*—
Inagaki, Tetsuya; Aoki, Hidemi; Aikawa, Hiroyasu; and Takahashi, Masao, 4,707,472, Cl. 514-58.000.

Zgliczynski, Marek; and Sesona, Giancarlo, to Aspera S.r.l. Method and apparatus for the assembly of rotary compressors particularly for motor compressor units for refrigerators and the like. 4,706,353, Cl. 29-156.40R.

Ziegenmeyer, James M.: *See*—
Lepp, Cyrus A.; Mussatto, James J.; and Ziegenmeyer, James M., 4,707,237, Cl. 204-182.800.

Zielinksi, Erich: *See*—
Winkler, Gert; and Zielinksi, Erich, 4,706,543, Cl. 89-38.000.

Zielinski, Albert: *See*—
Jenkins, Jerry V.; Sloan, Haskell F.; Frenkel, Robert L.; and Zielinski, Albert, 4,707,251, Cl. 209-569.000.

Zielinski, Erich; and Heckenbach, Theo, to Rheinmetall GmbH. Cannon loader for separate charge and projectile. 4,706,544, Cl. 89-46.000.

Zillikens, Josef: *See*—
Steudle, Ernst; Zillikens, Josef; and Boling, Gerd, 4,706,495, Cl. 73-64.300.

Zimmer, Ernst, to Kuka Schweissanlagen & Roboter GmbH. Protective device for guide track between two relatively movable machine parts. 4,706,510, Cl. 74-89.210.

Zimmerman, Harry K.: *See*—
Studt, William L.; Zimmerman, Harry K.; and Dodson, Stuart A., 4,707,478, Cl. 514-580.000.

Zinnbauer, Gerald, to Kardon Industries. Tamper resistant cap. 4,706,828, Cl. 215-246.000.

Zipperle, Kevin A.: *See*—
Jewell, J. N.; Korte, K. R.; Marshall, R. H.; and Zipperle, Kevin A., 4,706,691, Cl. 131-300.000.

Zollinger, Wendell D.; Boslego, John; Moran, Ellen; Brandt, Brenda; Collins, Hugh; Mandrell, Robert; Altieri, Patricia; and Berman, Sanford, to United States of America, Army. Process for the preparation of detoxified polysaccharide-outer membrane protein complexes, and their use as antibacterial vaccines. 4,707,543, Cl. 530-402.000.

Zurinski, Viktor: *See*—
Moeller, Reiner; Hetzel, Gert; Saugeon, Ulrich; Boheim, Gustav; and Zurinski, Viktor, 4,707,813, Cl. 367-103.000.

Zutell, Stephen W.; Wade, David A.; and Hanson, James V. Magnetic flatware retriever. 4,706,818, Cl. 209-636.000.

Zymark Corporation: *See*—
Friswell, David R., 4,707,452, Cl. 436-177.000.

31, Inc.: *See*—
Cornell, Robert, 4,706,731, Cl. 164-317.000.

501 Hecopharma B.V.: *See*—
Van Aken, Jan, 4,707,847, Cl. 378-170.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 17TH DAY OF NOVEMBER, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

De Jonge, Frederik A.: *See*—
Dorleijn, Jan W. F.; Druyvesteyn, Willem F.; and De Jonge, Frederik A., Re. 32,545, Cl. 365-32.000.

Dorleijn, Jan W. F.; Druyvesteyn, Willem F.; and De Jonge, Frederik A., to U.S. Philips Corporation. Magnetic domain logic device. Re. 32,545, Cl. 365-32.000.

Druyvesteyn, Willem F.: *See*—
Dorleijn, Jan W. F.; Druyvesteyn, Willem F.; and De Jonge, Frederik A., Re. 32,545, Cl. 365-32.000.

U.S. Philips Corporation: *See*—
Dorleijn, Jan W. F.; Druyvesteyn, Willem F.; and De Jonge, Frederik A., Re. 32,545, Cl. 365-32.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Aluminum Company of America: *See*—
Phelps, Frankie E.; Boget, Paul J.; and Troup, Robert L., B1 4,511,666, Cl. 501-98.000.

Boget, Paul J.: *See*—
Phelps, Frankie E.; Boget, Paul J.; and Troup, Robert L., B1 4,511,666, Cl. 501-98.000.

Phelps, Frankie E.; Boget, Paul J.; and Troup, Robert L., to Aluminum Company of America. Process for producing beta'-silicon aluminum oxynitride(B'-SiAlON). B1 4,511,666, 11-17-87, Cl. 501-98.000.

Troup, Robert L.: *See*—
Phelps, Frankie E.; Boget, Paul J.; and Troup, Robert L., B1 4,511,666, Cl. 501-98.000.

LIST OF DESIGN PATENTEES

Alfredo, Cavalli; Flippi, Cesarina, heir; Cavalli, Massimo F., heir; and Cavalli, Silvia, heir. Combined steam iron support and water tank. 292,837, 11-17-87, Cl. D32-73.000.

Allen, James H., to 'totes', Incorporated. Combined garment bag and briefcase. 292,744, 11-17-87, Cl. D3-48.000.

Allen, James H., to 'totes', Incorporated. Combined garment bag and twin club bags. 292,745, 11-17-87, Cl. D3-48.000.

Allen, James H., to 'totes', Incorporated. Combined briefcase and sport bag. 292,746, 11-17-87, Cl. D3-48.000.

Allen, James H., to 'totes', Incorporated. Combined club bag and sport bag. 292,747, 11-17-87, Cl. D3-48.000.

Allen, James H., to 'totes', Incorporated. Combined briefcase and overnight case. 292,748, 11-17-87, Cl. D3-71.000.

Allen, James H., to 'totes', Incorporated. Suitcase. 292,749, 11-17-87, Cl. D3-71.000.

American Cyanamid Company: *See*—
Keeler, James M.; Grip, John A.; and Morris, Edward, 292,775, Cl. D9-338.000.

Arma, John, Jr.: *See*—
Clayton, Fred A.; and Arma, John, Jr., 292,753, Cl. D4-119.000.

ATG Autoteile-Grosshandel GmbH: *See*—
Koch, Adolf, 292,791, Cl. D12-181.000.

Atlanta Cutlery Corporation: *See*—
Reinhardt, Julius H., 292,752, Cl. D3-102.000.

Autry Industries, Inc.: *See*—
Autry, James C., 292,784, Cl. D2-312.000.

Autry, James C., to Autry Industries, Inc. Athletic shoe. 292,784, 11-17-87, Cl. D2-312.000.

Babashak, John F., to Kontes Glass Company. Reservoir for solvent delivery. 292,824, 11-17-87, Cl. D24-8.000.

Bayly, Charles L. Toy train whistle. 292,779, 11-17-87, Cl. D10-119.000.

Bethune, William. Children's bed. 292,758, 11-17-87, Cl. D6-388.000.

Biolabimex AB: *See*—
Fele, Karl, 292,827, Cl. D24-51.000.

Brockman, James T.: *See*—
Kozy, George J.; and Brockman, James T., 292,831, Cl. D30-106.000.

Brogdon, Roy E. Pet casket. 292,839, 11-17-87, Cl. D99-1.000.

Broncorp Manufacturing Company, Inc.: *See*—
Powell, Patrick W., 292,803, Cl. D15-147.000.

Busalt, Gerhard, to Rowenta-Werke GmbH. Vacuum cleaner. 292,833, 11-17-87, Cl. D32-24.000.

Canon Kabushiki Kaisha: *See*—
Colani, Luigi, 292,805, Cl. D16-42.000.
Omino, Seiichi; and Itazawa, Toshiaki, 292,806, Cl. D18-1.000.

Carlson, Bradley C. Dispensing container. 292,773, 11-17-87, Cl. D9-300.000.

Cavalli, Massimo F., heir: *See*—
Alfredo, Cavalli; Flippi, Cesarina, heir; Cavalli, Massimo F., heir; and Cavalli, Silvia, heir, 292,837, Cl. D32-73.000.

Cavalli, Silvia, heir: *See*—
Alfredo, Cavalli; Flippi, Cesarina, heir; Cavalli, Massimo F., heir; and Cavalli, Silvia, heir, 292,837, Cl. D32-73.000.

CertainTeed Corporation: *See*—
Reisinger, Ludwig; and Westphal, Dennis, 292,829, Cl. D25-124.000.

Challen, Judith B. Pillow. 292,767, 11-17-87, Cl. D6-601.000.

Chamberlain Manufacturing Corporation: *See*—
Henry, Susanne G., 292,792, Cl. D13-2.000.

Charles C. Worth Corporation: *See*—
Worth, Carol D.; Worth, Ann B.; and Worth, Charles C., 292,760, Cl. D6-434.000.

Cilvio, Franco; and Raffler, Dieter, to Gardena Kress & Kastner GmbH. Humidity sensor. 292,778, 11-17-87, Cl. D10-56.000.

Clayton, Fred A.; and Arma, John, Jr. Golfers brush. 292,753, 11-17-87, Cl. D4-119.000.

Colani, Luigi, to Canon Kabushiki Kaisha. Electronic flash unit. 292,805, 11-17-87, Cl. D16-42.000.

Cugley, Derwyn, to VSI Fasteners, Inc. Packaging container. 292,776, 11-17-87, Cl. D9-415.000.

Danna, Sabrina M.: *See*—
Fogarty, A. Edward; Fogarty, Bonnie R.; and Danna, Sabrina M., 292,811, Cl. D21-153.000.

Davidson, Grant M. N., to U.S. Philips Corporation. Portable radio receiver. 292,800, 11-17-87, Cl. D14-70.000.

Davis, Myron F., Jr.; and Kelley, Ted F., Jr., to International Business Machines Corporation. Keyboard for a computer. 292,801, 11-17-87, Cl. D14-100.000.

Dewart, William E.; and Lovitz, David S., to Durland & Associates, Ltd. Mobile music and recording storage unit. 292,761, 11-17-87, Cl. D6-445.000.

Dragan, William B. Dental tip. 292,825, 11-17-87, Cl. D24-16.000.

Durland & Associates, Ltd.: *See*—
Dewart, William E.; and Lovitz, David S., 292,761, Cl. D6-445.000.

Dyer, Wayne. Balance toy. 292,808, 11-17-87, Cl. D21-102.000.

Edwards, Douglas F., to J. B. Foote Foundry Co., The. Transaxle. 292,804, 11-17-87, Cl. D15-149.000.

Eslinger, Hartmut H.; Wingate, Barry; and Gingele, Thomas, to Frogdesign Hartmut Eslinger Inc. Worktable or similar article. 292,765, 11-17-87, Cl. D6-484.000.
Fails, Earl B., to U. S. Works-86, Inc. Ice cube tray. 292,802, 11-17-87, Cl. D15-90.000.
Falcone, Dominic. Telephone. 292,799, 11-17-87, Cl. D14-64.000.
Fele, Karl, to Biolabimex AB. Combined evacuated blood sampling tube and sedimentation rate column. 292,827, 11-17-87, Cl. D24-51.000.
Fieldcrest Cannon, Inc.: *See*—
Kester, Melvin E., 292,764, Cl. D6-465.000.
Fisher, Jerry A.; Leach, Ronald J.; Patterson, Hugh R.; and Yoko, Gary J., to Ponderosa, Inc. Building structure. 292,828, 11-17-87, Cl. D25-17.000.
Flippi, Cesarina, heir: *See*—
Alfredo, Cavalli; Flippi, Cesarina, heir; Cavalli, Massimo F., heir; and Cavalli, Silvia, heir, 292,837, Cl. D32-73.000.
Fogarty, A. Edward; Fogarty, Bonnie R.; and Danna, Sabrina M., to Hasbro-Bradley, Inc. Finger puppet or similar article. 292,811, 11-17-87, Cl. D21-153.000.
Fogarty, Bonnie R.: *See*—
Fogarty, A. Edward; Fogarty, Bonnie R.; and Danna, Sabrina M., 292,811, Cl. D21-153.000.
Frogdesign Hartmut Eslinger Inc.: *See*—
Eslinger, Hartmut H.; Wingate, Barry; and Gingele, Thomas, 292,765, Cl. D6-484.000.
G. S. Blodgett Co., Inc.: *See*—
Le Sage, Richard; Reshanov, Eugene N.; and Schlemmer, Richard A., 292,838, Cl. D34-25.000.
Galask, Robert J. Earring. 292,780, 11-17-87, Cl. D11-48.000.
Gardena Kress & Kastner GmbH: *See*—
Cilvio, Franco; and Raffler, Dieter, 292,778, Cl. D10-56.000.
Gingele, Thomas: *See*—
Eslinger, Hartmut H.; Wingate, Barry; and Gingele, Thomas, 292,765, Cl. D6-484.000.
Giordano, John M. Chair. 292,757, 11-17-87, Cl. D6-380.000.
Glomar Southeast Asia (PTE) Ltd.: *See*—
Hung, Patrick, 292,743, Cl. D3-30.100.
Grip, John A.: *See*—
Keeler, James M.; Grip, John A.; and Morris, Edward, 292,775, Cl. D9-338.000.
Hardenbergh, James S.; Knipe, Curtis L.; and Stuesser, William R., to Sara Lee Corporation. Ham frame. 292,769, 11-17-87, Cl. D7-409.000.
Hasbro-Bradley, Inc.: *See*—
Fogarty, A. Edward; Fogarty, Bonnie R.; and Danna, Sabrina M., 292,811, Cl. D21-153.000.
Henry, Susanne G., to Chamberlain Manufacturing Corporation. Motor housing for a garage door operator. 292,792, 11-17-87, Cl. D13-2.000.
Hung, Patrick, to Patrick Plastics Inc.; and Glomar Southeast Asia (PTE) Ltd. Circuit board carrier. 292,743, 11-17-87, Cl. D3-30.100.
International Business Machines Corporation: *See*—
Davis, Myron F., Jr.; and Kelley, Ted F., Jr., 292,801, Cl. D14-100.000.
Itazawa, Toshiaki: *See*—
Omino, Seiichi; and Itazawa, Toshiaki, 292,806, Cl. D18-1.000.
J. B. Foote Foundry Co., The: *See*—
Edwards, Douglas F., 292,804, Cl. D15-149.000.
J. C. Penney Co., Inc.: *See*—
Viola, Michael D., 292,740, Cl. D2-28.000.
J.R.C. Flag Holders Corporation: *See*—
Restrepo, Julian, 292,782, Cl. D11-182.000.
Restrepo, Julian, 292,783, Cl. D11-182.000.
John Manufacturing Limited: *See*—
Yuen, John S., 292,830, Cl. D26-42.000.
Juergens, David A., to Rubbermaid Commercial Products Inc. Bucket. 292,836, 11-17-87, Cl. D32-53.000.
Kadomaru, Kazuo, to Sumitomo Rubber Industries, Ltd. Motorcycle tire. 292,787, 11-17-87, Cl. D12-147.000.
KBR, Inc.: *See*—
Kearney, Robert L., 292,768, Cl. D7-38.000.
Kearney, Robert L., to KBR, Inc. Food service tray. 292,768, 11-17-87, Cl. D7-38.000.
Keeler, James M.; Grip, John A.; and Morris, Edward, to American Cyanamid Company. Combined dispensing container and solid stick product. 292,775, 11-17-87, Cl. D9-338.000.
Kelley, Ted F., Jr.: *See*—
Davis, Myron F., Jr.; and Kelley, Ted F., Jr., 292,801, Cl. D14-100.000.
Kemp, Willard E. Gate valve. 292,820, 11-17-87, Cl. D23-244.000.
Kenner Parker Toys Inc.: *See*—
Zacherle, Bonnie, 292,812, Cl. D21-171.000.
Zacherle, Bonnie, 292,813, Cl. D21-171.000.
Zacherle, Bonnie, 292,814, Cl. D21-171.000.
Zacherle, Bonnie, 292,815, Cl. D21-177.000.
Zacherle, Bonnie, 292,816, Cl. D21-171.000.
Zacherle, Bonnie, 292,817, Cl. D21-171.000.
Zacherle, Bonnie, 292,818, Cl. D21-178.000.
Kester, Melvin E., to Fieldcrest Cannon, Inc. Modular display rack. 292,764, 11-17-87, Cl. D6-465.000.
Kim, Bonjue. Ratchet wrench. 292,771, 11-17-87, Cl. D8-25.000.
Klemans, Henri. Doll. 292,810, 11-17-87, Cl. D21-148.000.
Knipe, Curtis L.: *See*—
Hardenbergh, James S.; Knipe, Curtis L.; and Stuesser, William R., 292,769, Cl. D7-409.000.
Koch, Adolf, to Sport-Service-Lorinser Sportliche Autoausrustung GmbH. Rear spoiler-bumper. 292,788, 11-17-87, Cl. D12-181.000.
Koch, Adolf, to Sport-Service-Lorinser Sportliche Autoausrustung GmbH. Rear spoiler. 292,789, 11-17-87, Cl. D12-181.000.
Koch, Adolf, to ATG Autoteile-Grosshandel GmbH. Spoiler. 292,791, 11-17-87, Cl. D12-181.000.
Kontes Glass Company: *See*—
Babashak, John F., 292,824, Cl. D24-8.000.
Koosman, Walter G. Wire puzzle. 292,809, 11-17-87, Cl. D21-106.000.
Kozy, George J.; and Brockman, James T. Aquarium backing unit. 292,831, 11-17-87, Cl. D30-106.000.
Leach, Ronald J.: *See*—
Fisher, Jerry A.; Leach, Ronald J.; Patterson, Hugh R.; and Yoko, Gary J., 292,828, Cl. D25-17.000.
Le Sage, Richard; Reshanov, Eugene N.; and Schlemmer, Richard A., to G. S. Blodgett Co., Inc. Transportable cart. 292,838, 11-17-87, Cl. D34-25.000.
Lovitz, David S.: *See*—
Dewart, William E.; and Lovitz, David S., 292,761, Cl. D6-445.000.
Mascenic, Francis J., Jr. Easel. 292,754, 11-17-87, Cl. D6-300.000.
McFerrin, Michael. Heel shield. 292,741, 11-17-87, Cl. D2-314.000.
McGraw, George L. Multiple unit bottle. 292,774, 11-17-87, Cl. D9-307.000.
McNeil, Charles R., II. Telephone set. 292,797, 11-17-87, Cl. D14-53.000.
Med-Safe Systems, Inc.: *See*—
Shillington, Richard A.; and Oberschmidt, Alec, 292,777, Cl. D9-446.000.
Morris, Edward: *See*—
Keeler, James M.; Grip, John A.; and Morris, Edward, 292,775, Cl. D9-338.000.
Newman, Frank H. C., to U.S. Philips Corporation. Combined car radio and cassette player. 292,795, 11-17-87, Cl. D14-5.000.
Nitowski, Ronald: *See*—
Thomas, Stephen M.; and Nitowski, Ronald, 292,794, Cl. D13-28.000.
Oberschmidt, Alec: *See*—
Shillington, Richard A.; and Oberschmidt, Alec, 292,777, Cl. D9-446.000.
Omino, Seiichi; and Itazawa, Toshiaki, to Canon Kabushiki Kaisha. Electronic typewriter. 292,806, 11-17-87, Cl. D18-1.000.
Opsvik, Peter. Chair. 292,756, 11-17-87, Cl. D6-335.000.
Pace Industries, Inc.: *See*—
Palka, James J., 292,766, Cl. D6-494.000.
Palka, James J., to Pace Industries, Inc. Cabinet door. 292,766, 11-17-87, Cl. D6-494.000.
Patrick Plastics Inc.: *See*—
Hung, Patrick, 292,743, Cl. D3-30.100.
Patterson, Hugh R.: *See*—
Fisher, Jerry A.; Leach, Ronald J.; Patterson, Hugh R.; and Yoko, Gary J., 292,828, Cl. D25-17.000.
Pell, William. Rollaway bed. 292,759, 11-17-87, Cl. D6-392.000.
Ponderosa, Inc.: *See*—
Fisher, Jerry A.; Leach, Ronald J.; Patterson, Hugh R.; and Yoko, Gary J., 292,828, Cl. D25-17.000.
Powell, Patrick W., to Broncorp Manufacturing Company, Inc. Paint can shaker. 292,803, 11-17-87, Cl. D15-147.000.
Pranica, Rebecca W., to Zwicker Knitting Mills. Sock or similar article. 292,742, 11-17-87, Cl. D2-329.000.
Raffler, Dieter: *See*—
Cilvio, Franco; and Raffler, Dieter, 292,778, Cl. D10-56.000.
Reid, Walter B., III. Lamp socket or the like. 292,793, 11-17-87, Cl. D13-25.000.
Reinhardt, Julius H., to Atlanta Cutlery Corporation. Knife sheath. 292,752, 11-17-87, Cl. D3-102.000.
Reisinger, Ludwig; and Westphal, Dennis, to CertainTeed Corporation. Design for a window component extrusion. 292,829, 11-17-87, Cl. D25-124.000.
Remington, Robert W., to Wimer, Claude R., Jr., a part interest. Combined assault pistol holster and belt. 292,751, 11-17-87, Cl. D3-101.000.
Reshanov, Eugene N.: *See*—
Le Sage, Richard; Reshanov, Eugene N.; and Schlemmer, Richard A., 292,838, Cl. D34-25.000.
Restrepo, Julian, to J.R.C. Flag Holders Corporation. Flagpole holder. 292,782, 11-17-87, Cl. D11-182.000.
Restrepo, Julian, to J.R.C. Flag Holders Corporation. Flagpole holder. 292,783, 11-17-87, Cl. D11-182.000.
Rich, Beverly C. Stand for printers and computers. 292,763, 11-17-87, Cl. D6-462.000.
Rosenthal, Maurice I. Microphone support. 292,796, 11-17-87, Cl. D14-13.000.
Rowenta-Werke GmbH: *See*—
Busalt, Gerhard, 292,833, Cl. D32-24.000.
Rubbermaid Commercial Products Inc.: *See*—
Juergens, David A., 292,836, Cl. D32-53.000.
St. Clair, Joseph. Housing for a fan. 292,823, 11-17-87, Cl. D23-382.000.
Sara Lee Corporation: *See*—
Hardenbergh, James S.; Knipe, Curtis L.; and Stuesser, William R., 292,769, Cl. D7-409.000.
Schaber, John F. Garbage pusher or the like. 292,835, 11-17-87, Cl. D32-35.000.
Schlemmer, Richard A.: *See*—
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Schneck, Rick L. Deflector plate for the underbody of a sports car. 292,790, 11-17-87, Cl. D12-190.000.
Schoonhoven, Jan G. J. Tire. 292,786, 11-17-87, Cl. D12-147.000.

Scurto, Russell S. Can piercer. 292,770, 11-17-87, Cl. D8-18.000.
Shane, Robert W. Display plaque. 292,781, 11-17-87, Cl. D11-132.000.
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Shay, John. Boot hanger. 292,755, 11-17-87, Cl. D6-317.000.
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Thomas, Stephen M.; and Nitowski, Ronald, 292,794, Cl. D13-28.000.
Skewis, William A. Combination staple remover and tape cutter. 292,772, 11-17-87, Cl. D8-48.000.
Slachta, Nancy. Electric drill attachment for mounting cleaning pad or the like. 292,834, 11-17-87, Cl. D32-25.000.
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Sport-Service-Lorinser Sportliche Autoausrustung GmbH: *See*—
Koch, Adolf, 292,788, Cl. D12-181.000.
Koch, Adolf, 292,789, Cl. D12-181.000.
Sproles, Ronnie R. Medicine dispensing bandage. 292,826, 11-17-87, Cl. D24-49.000.
Stuesser, William R.: *See*—
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Sumitomo Rubber Industries, Ltd.: *See*—
Kadomaru, Kazuo, 292,787, Cl. D12-147.000.
Thomas, Stephen M.; and Nitowski, Ronald, to Siemon Company, The. Eight conductor modular plug. 292,794, 11-17-87, Cl. D13-28.000.
'totes', Incorporated: *See*—
Allen, James H., 292,744, Cl. D3-48.000.
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Allen, James H., 292,746, Cl. D3-48.000.
Allen, James H., 292,747, Cl. D3-48.000.
Allen, James H., 292,748, Cl. D3-71.000.
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Tsolkas, Ilias. Liquid level control valve. 292,821, 11-17-87, Cl. D23-236.000.
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Tsukada, Akira: *See*—
Yamamoto, Sachio; and Tsukada, Akira, 292,832, Cl. D32-18.000.
U.S. Philips Corporation: *See*—
Davidson, Grant M. N., 292,800, Cl. D14-70.000.
Newman, Frank H. C., 292,795, Cl. D14-5.000.
U. S. Works-86, Inc.: *See*—
Fails, Earl B., 292,802, Cl. D15-90.000.
Viola, Michael D., to J. C. Penney Co., Inc. Maternity slack. 292,740, 11-17-87, Cl. D2-28.000.
Visnapuu, Andres H. Copyholder. 292,807, 11-17-87, Cl. D19-91.000.
VSI Fasteners, Inc.: *See*—
Cugley, Derwyn, 292,776, Cl. D9-415.000.
Warren, Robert A. Floating boat trailer. 292,785, 11-17-87, Cl. D12-101.000.
Westphal, Dennis: *See*—
Reisinger, Ludwig; and Westphal, Dennis, 292,829, Cl. D25-124.000.
Whatley, Sammy W. Toy stick for rolling a disc. 292,819, 11-17-87, Cl. D21-210.000.
Williamson, Violetta. Table. 292,762, 11-17-87, Cl. D6-451.000.
Wimer, Claude R., Jr.: *See*—
Remington, Robert W., 292,751, Cl. D3-101.000.
Wingate, Barry: *See*—
Esslinger, Hartmut H.; Wingate, Barry; and Gingele, Thomas, 292,765, Cl. D6-484.000.
Worth, Ann B.: *See*—
Worth, Carol D.; Worth, Ann B.; and Worth, Charles C., 292,760, Cl. D6-434.000.
Worth, Carol D.; Worth, Ann B.; and Worth, Charles C., to Charles C. Worth Corporation. Oriental chest. 292,760, 11-17-87, Cl. D6-434.000.
Worth, Charles C.: *See*—
Worth, Carol D.; Worth, Ann B.; and Worth, Charles C., 292,760, Cl. D6-434.000.
Wu, Richard. Telephone set. 292,798, 11-17-87, Cl. D14-53.000.
Yamamoto, Sachio; and Tsukada, Akira, to Sharp Corporation. Vacuum cleaner. 292,832, 11-17-87, Cl. D32-18.000.
Yoko, Gary J.: *See*—
Fisher, Jerry A.; Leach, Ronald J.; Patterson, Hugh R.; and Yoko, Gary J., 292,828, Cl. D25-17.000.
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Zacherle, Bonnie, to Kenner Parker Toys Inc. Toy figure. 292,812, 11-17-87, Cl. D21-171.000.
Zacherle, Bonnie, to Kenner Parker Toys Inc. Toy figure. 292,813, 11-17-87, Cl. D21-171.000.
Zacherle, Bonnie, to Kenner Parker Toys Inc. Toy figure. 292,814, 11-17-87, Cl. D21-171.000.
Zacherle, Bonnie, to Kenner Parker Toys Inc. Toy figure. 292,815, 11-17-87, Cl. D21-177.000.
Zacherle, Bonnie, to Kenner Parker Toys Inc. Toy figure. 292,816, 11-17-87, Cl. D21-171.000.
Zacherle, Bonnie, to Kenner Parker Toys Inc. Toy figure. 292,817, 11-17-87, Cl. D21-171.000.
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CLASSIFICATION OF PATENTS

ISSUED NOVEMBER 17, 1987

NOTE.—First number, class; second number, subclass; third number, patent number

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634 4,707,264
638 4,707,265
4,707,266
650 4,707,267
4,707,268
651 4,707,269
683 4,707,270
701 4,707,271
709 4,707,272
724 4,707,273
774 4,707,274
787 4,707,275
789 4,707,276
805 4,707,277

CLASS 211

41 4,706,819
59.2 4,706,820
59.4 4,706,822
133 4,706,823
188 4,706,824
593 4,706,821

CLASS 212

182 4,706,825

CLASS 213

61 4,706,826

CLASS 215

11.3 4,706,827
246 4,706,828
354 4,706,829
365 4,706,830

CLASS 219

56.22 4,707,579
69 W 4,707,580
73.11 4,707,581
86.41 4,707,582
121 LG 4,707,584
121 LV 4,707,585
121 P 4,707,583
203 4,707,586
299 4,707,587
400 4,707,588
464 4,707,589
523 4,707,590
541 4,707,591

CLASS 220

3.2 4,706,831
66 4,706,832
67 4,706,833
230 4,706,834
256 4,706,836
258 4,706,835
270 4,706,837
4,706,838
315 4,706,839
373 4,706,840
375 4,706,841

CLASS 221

14 4,706,842
48 4,706,843
59 4,706,844
102 4,706,845
232 4,706,846

CLASS 222

1 4,706,847
79 4,706,848
80 4,706,849
105 4,706,850
106 4,706,851
146.2 4,706,852
391 4,706,853
459 4,706,854
511 4,706,855
526 4,706,874

CLASS 224

151 4,706,856
164 4,706,857
184 4,706,858
224 4,706,859
247 4,706,860

CLASS 226

74 4,706,861
92 4,706,862
95 4,706,863

CLASS 227

109 4,706,864
110 4,706,865
120 4,706,866
130 4,706,867
149 4,706,868
156 4,706,869

CLASS 228

123 4,706,870
158 4,706,871
194 4,706,872

CLASS 229

1.5 B 4,706,873
52 B 4,706,876
73 4,706,877
4,706,878
194 4,706,879

CLASS 232

35 4,706,880

CLASS 235

379 4,707,592
487 4,707,593
488 4,707,594

CLASS 236

15 BD 4,706,881
46 R 4,706,882

CLASS 237

2 B 4,706,883
55 4,706,884

CLASS 239

76 4,706,885
265.33 4,706,886
453 4,706,887
478 4,706,888
550 4,706,889
692 4,706,890

CLASS 241

16 4,706,891
4,706,892
23 4,706,893
30 4,706,894
37.5 4,706,895
4,706,896
4,706,897
73 4,706,898
4,706,899
121 4,706,900
188 R 4,706,903

CLASS 242

55.53 4,706,904
68.4 4,706,905
86 4,706,906

CLASS 244

49 4,706,907
54 4,706,901
76 C 4,706,902
118.5 4,706,908
122 AC 4,706,909
130 4,706,910
134 A 4,706,911
158 A 4,706,912
214 4,706,913

CLASS 248

74.3 4,706,914
122 4,706,915
168 4,706,916
205.1 4,706,917
210 4,706,918
281.1 4,706,919
371 4,706,920
545 4,706,921
546 4,706,922
638 4,706,923

CLASS 249

161 4,706,924
162 4,706,925
169 4,706,926
177 4,706,927
184 4,706,928

CLASS 250

201 4,707,596
209 4,707,597
223 R 4,707,598
4,707,599
227 4,707,600
231 SE 4,707,601
282 4,707,602
339 4,707,603
342 4,707,604
347 4,707,605
374 4,707,606
385 4,707,607
389 4,707,608
492.1 4,707,609
504 R 4,707,595
560 4,707,610
4,707,611
568 4,707,612
572 4,707,613
576 4,707,614
578 4,707,615

CLASS 251

14 4,706,929
26 4,706,930
31 4,706,932
54 4,706,933
87 4,706,934
122 4,707,278
339 4,707,279

CLASS 252

8.514 4,707,281
11 4,707,282
25 4,707,283
32.7 E 4,707,284
46.6 4,707,301
49.6 4,707,280
50 4,707,285
75 4,707,286
91 4,707,287
121 4,707,288
135 4,707,289
140 4,707,290
174.12 4,707,291
174.16 4,707,292
174.17 4,707,293
182 4,707,294
299.62 4,707,295
299.67 4,707,296
301.16 4,707,297
378 R 4,707,298
400.1 4,707,299
404 4,707,300
583 4,707,303
609 4,707,304

CLASS 254

29 R 4,706,935
89 R 4,706,936
93 H 4,706,937
133 R 4,706,938
332 4,706,939
333 4,706,940

CLASS 256

10 4,706,941
35 4,706,942

CLASS 260

396 N 4,707,305
501.12 4,707,306
502 R 4,707,307

CLASS 261

77 4,707,308

CLASS 264

12 4,707,309
40.6 4,707,310
43 4,707,311
4,707,312
61 4,707,313
127 4,707,314
129 4,707,315
135 4,707,316
136 4,707,317
138 4,707,318
168 4,707,319
242 4,707,320
294 4,707,321

CLASS 266

265 4,706,943
272 4,706,944

CLASS 267

140.1 4,706,947
186 4,706,945
292 4,706,946

CLASS 269

34 4,706,948
283 4,706,949

CLASS 270

54 4,706,950
55 4,706,951

CLASS 272

85 4,706,952
120 4,706,953

CLASS 273

1.5 A 4,706,954
73 A 4,706,955
153 S 4,706,956
188 R 4,706,957
213 4,706,958
247 4,706,959
257 4,706,960
274 4,706,961
347 4,706,962
348.1 4,706,963
413 4,706,964
416 4,706,965

CLASS 277

27 4,706,966
33 4,706,967
53 4,706,968
83 4,706,969
205 4,706,970
215 4,706,971

CLASS 279

1 SJ 4,706,973
2 R 4,706,972

CLASS 280

11.115 4,706,974
33.99 A 4,706,975
91 4,706,976
4,706,977
4,706,978
4,706,979
154 4,706,980
154.5 R 4,706,981
238 4,706,982
414.2 4,706,983
432 4,706,984
610 4,706,985
642 4,706,986
661 4,706,987
676 4,706,988
701 4,706,989
734 4,706,990
770 4,706,991
801 4,706,992
808 4,706,993

CLASS 281

29 4,706,994
42 4,706,995

CLASS 282
1 R 4,706,996
CLASS 285
13 4,706,997
167 4,706,998
196 4,706,999
305 4,707,000
332.3 4,707,001
334.2 4,707,002
CLASS 290
48 4,707,616
55 4,707,617
CLASS 292
45 4,707,003
91 4,707,004
332 4,707,005
336.3 4,707,006
341.16 4,707,007
CLASS 293
128 4,707,008
4,707,009
CLASS 294
16 4,707,011
64.1 4,707,012
119.1 4,707,013
CLASS 296
1 S 4,707,014
4,707,015
39 R 4,707,016
78.1 4,707,017
97 K 4,707,019
191 4,707,020
196 4,707,021
222 4,707,022
976 4,707,018
CLASS 297
31 4,707,023
250 4,707,024
259 4,707,025
281 4,707,026
284 4,707,027
300 4,707,028
4,707,029
341 4,707,030
379 4,707,010
393 4,707,031
416 4,707,032
452 4,707,033
CLASS 301
6 V 4,707,034
37 P 4,707,035
CLASS 303
6 C 4,707,036
22 R 4,707,037
CLASS 307
64 4,707,618
106 4,707,619
270 4,707,620
441 4,707,621
448 4,707,622
475 4,707,623
491 4,707,624
578 4,707,625
625 4,707,626
CLASS 310
71 4,707,627
89 4,707,628
129 4,707,629
154 4,707,630
313 A 4,707,631
CLASS 312
257 SM 4,707,038
CLASS 313
112 4,707,632
402 4,707,633
432 4,707,634
466 4,707,635
625 4,707,636
CLASS 315
111.81 4,707,637
169.3 4,707,638
382 4,707,639
408 4,707,640
CLASS 318
37 4,707,642
77 4,707,643
136 4,707,644
254 4,707,645
332 4,707,646
443 4,707,641
568 4,707,647
640 4,707,648
685 4,707,649
4,707,650
800 4,707,651
CLASS 324
58.5 B 4,707,652
78 R 4,707,653
158 F 4,707,656
4,707,657
158 P 4,707,655
158 R 4,707,654
309 4,707,658
4,707,659
4,707,660
4,707,661
318 4,707,662
319 4,707,663
322 4,707,664
CLASS 328
14 4,707,665
CLASS 329
110 4,707,666
CLASS 330
9 4,707,667
56 4,707,668
CLASS 331
99 4,707,669
CLASS 332
19 4,707,670
CLASS 333
1 4,707,671
4 4,707,672
112 4,707,673
CLASS 335
13 4,707,674
130 4,707,675
216 4,707,676
284 4,707,677
CLASS 336
210 4,707,678
CLASS 340
310 A 4,707,679
347 AD 4,707,682
347 DD 4,707,681
347 NT 4,707,680
347 P 4,707,683
530 4,707,684
573 4,707,685
596 4,707,686
680 4,707,687
4,707,688
706 4,707,689
750 4,707,690
754 4,707,691
805 4,707,692
825.32 4,707,804
825.51 4,707,693
825.52 4,707,694
870.31 4,707,695
954 4,707,696
CLASS 342
25 4,707,697
179 4,707,698
352 4,707,699
CLASS 343
712 4,707,700
4,707,701
786 4,707,702
CLASS 346
1.1 4,707,703
24 4,707,704
75 4,707,705
76 PH 4,707,706
4,707,707
4,707,708
108 4,707,709
4,707,710
4,707,711
136 4,707,712
140 R 4,707,713
4,707,714
160 4,707,715
CLASS 350
3.6 4,707,053
3.65 4,707,054
3.71 4,707,055
96.12 4,707,056
4,707,057
4,707,058
96.13 4,707,059
96.14 4,707,060
96.16 4,707,061
4,707,062
96.18 4,707,063
96.19 4,707,064
96.20 4,707,065
4,707,066
4,707,067
96.21 4,707,068
4,707,069
4,707,070
4,707,071
4,707,072
96.23 4,707,073
4,707,074
4,707,075
96.26 4,707,076
96.34 4,707,077
162.12 4,707,078
332 4,707,079
334 4,707,080
4,707,081
388 4,707,082
425 4,707,083
429 4,707,084
432 4,707,085
480 4,707,086
536 4,707,087
638 4,707,088
CLASS 351
56 4,707,089
138 4,707,090
211 4,707,091
CLASS 352
47 4,707,092
CLASS 353
109 4,707,093
CLASS 354
1 4,707,094
64 4,707,095
173.11 4,707,096
215 4,707,097
217 4,707,098
219 4,707,099
251 4,707,127
266 4,707,100
273 4,707,101
289.1 4,707,102
4,707,103
403 4,707,104
412 4,707,105
4,707,106
481 4,707,107
CLASS 355
3 DD 4,707,117
3 SH 4,707,108
4 4,707,109
7 4,707,110
4,707,111
8 4,707,112
10 4,707,114
14 D 4,707,113
14 SH 4,707,126
4,707,115
15 4,707,116
30 4,707,118
38 4,707,119
4,707,120
40 4,707,121
71 4,707,122
73 4,707,123
83 4,707,124
94 4,707,125
CLASS 356
4 4,707,128
4.5 4,707,129
28 4,707,130
73 4,707,131
241 4,707,132
320 4,707,133
342 4,707,134
347 4,707,135
350 4,707,136
353 4,707,137
402 4,707,138
CLASS 357
17 4,707,716
23.11 4,707,717
45 4,707,718
53 4,707,719
4,707,720
54 4,707,721
67 4,707,722
4,707,723
71 4,707,724
72 4,707,725
81 4,707,726
CLASS 358
10 4,707,727
12 4,707,728
13 4,707,729
4,707,730
22 4,707,731
31 4,707,732
106 4,707,734
108 4,707,735
113 4,707,736
133 4,707,737
135 4,707,738
139 4,707,739
153 4,707,740
171 4,707,741
183 4,707,742
213.13 4,707,743
213.26 4,707,744
231 4,707,746
283 4,707,745
294 4,707,747
298 4,707,748
342 4,707,733
CLASS 360
14.3 4,707,749
60 4,707,750
97 4,707,751
99 4,707,752
106 4,707,753
4,707,754
114 4,707,755
131 4,707,756
132 4,707,757
CLASS 361
18 4,707,758
48 4,707,759
90 4,707,760
93 4,707,761
124 4,707,762
386 4,707,763
390 4,707,764
401 4,707,765
CLASS 362
11 4,707,766
61 4,707,767
66 4,707,768
4,707,769
4,707,770
4,707,771
110 4,707,772
303 4,707,773
CLASS 363
37 4,707,774
4,707,775
134 4,707,776
138 4,707,777
CLASS 364
132 4,707,778
148 4,707,779
176 4,707,780
200 4,707,781
4,707,782
4,707,783
4,707,784
405 4,707,785
414 4,707,786
4,707,822
420 4,707,787
424 4,707,788
424.1 4,707,789
431.04 4,707,791
431.07 4,707,792
474 4,707,793
478 4,707,790
513.5 4,707,794
550 4,707,795
552 4,707,796
607 4,707,797
765 4,707,798
771 4,707,799
788 4,707,800
900 4,707,801
4,707,802
4,707,803
4,707,805
CLASS 365
32 Re.32,545
96 4,707,806
154 4,707,807
182 4,707,808
189 4,707,809
200 4,707,810
239 4,707,811
CLASS 366
77 4,707,139
186 4,707,140
CLASS 367
46 4,707,812
103 4,707,813
CLASS 368
11 4,707,141
46 4,707,142
165 4,707,143
4,707,144
201 4,707,145
316 4,707,146
CLASS 369
13 4,707,814
33 4,707,815
44 4,707,816
46 4,707,817
59 4,707,818
77.2 4,707,819
284 4,707,820
292 4,707,821
CLASS 370
1 4,707,823
32.1 4,707,824
60 4,707,825
4,707,826
85 4,707,827
4,707,828
86 4,707,829
89 4,707,830
94 4,707,831
124 4,707,832
CLASS 371
15 4,707,833
20 4,707,834
CLASS 372
4,707,835
29 4,707,836
34 4,707,837
38 4,707,838
CLASS 374
161 4,707,147
208 4,707,148
CLASS 375
1 4,707,839
14 4,707,840
106 4,707,841
110 4,707,842
CLASS 376
194 4,707,322
203 4,707,323
215 4,707,324
345 4,707,325
261 4,707,326
294 4,707,327
446 4,707,328
449 4,707,329
457 4,707,330
463 4,707,331
CLASS 377
8 4,707,843
58 4,707,844
CLASS 378
145 4,707,846
170 4,707,847
CLASS 379
1 4,707,848
28 4,707,849
29 4,707,850
4,707,851
107 4,707,852
221 4,707,853
356 4,707,854
376 4,707,855
CLASS 381
15 4,707,856
43 4,707,857
4,707,858
CLASS 382
28 4,707,859
CLASS 384
294 4,707,149
481 4,707,150
495 4,707,151
572 4,707,152
CLASS 400
121 4,707,153
185 4,707,154
199 4,707,155
613.2 4,707,156
616 4,707,157
616.2 4,707,158
639.1 4,707,159
CLASS 419
28 4,707,332
CLASS 420
590 4,707,333
CLASS 422
28 4,707,334
44 4,707,335
84 4,707,336
100 4,707,337
124 4,707,338
133 4,707,339
140 4,707,340
171 4,707,341
300 4,707,343
CLASS 423
248 4,707,342
312 4,707,344
326 4,707,345
518 4,707,346
552 4,707,347
554 4,707,348
558 4,707,349
637 4,707,350
648 R 4,707,351
CLASS 424
1.1 4,707,352
4,707,353
47 4,707,354
84 4,707,355
88 4,707,356
4,707,357
89 4,707,358
92 4,707,359
94.1 4,707,360
154 4,707,361
433 4,707,362
CLASS 426
3 4,707,363
36 4,707,364
94 4,707,365
96 4,707,366
4,707,367
386 4,707,368
417 4,707,369
443 4,707,370
462 4,707,371
481 4,707,372
540 4,707,373
572 4,707,374
578 4,707,375
658 4,707,376
CLASS 427
8 4,707,377
4,707,378
34 4,707,379
40 4,707,380
58 4,707,382
168 4,707,383
249 4,707,384
374.1 4,707,385
386 4,707,386
393.5 4,707,387
407.1 4,707,381
CLASS 428
36 4,707,388
4,707,389
57 4,707,390
63 4,707,391
65 4,707,392
178 4,707,393
209 4,707,394
212 4,707,395
216 4,707,396
4,707,397
224 4,707,398
225 4,707,399
260 4,707,400
317.5 4,707,401
328 4,707,402
4,707,403
335 4,707,404
336 4,707,405
4,707,406
361 4,707,407
379 4,707,408
397 4,707,409
413 4,707,410
4,707,411
432 4,707,412
440 4,707,413
511 4,707,414
621 4,707,415
627 4,707,416
630 4,707,417
675 4,707,418
690 4,707,419
CLASS 429
11 4,707,420
48 4,707,422
94 4,707,421
112 4,707,423
181 4,707,424
CLASS 430
21 4,707,425
25 4,707,426
59 4,707,427
102 4,707,428
115 4,707,429
270 4,707,430
271 4,707,431
281 4,707,432

289 4,707,433
393 4,707,434
494 4,707,435
504 4,707,436
523 4,707,437

CLASS 435

5 4,707,438
4,707,439
6 4,707,440
7 4,707,441
4,707,442
4,707,443
26 4,707,444
91 4,707,445
132 4,707,446
4,707,447
240.25 4,707,448
255 4,707,449
295 4,707,450

CLASS 436

63 4,707,451
177 4,707,452
301 4,707,453
546 4,707,454

CLASS 437

4 4,706,376
24 4,706,377
4,706,378
57 4,707,455
59 4,707,456
189 4,707,197
193 4,707,457
225 4,706,374

CLASS 439

75 4,707,039
131 4,707,041
140 4,707,042
142 4,707,043
271 4,707,047
289 4,707,044
314 4,707,046
510 4,707,040
588 4,707,045
620 4,707,048
4,707,049
747 4,707,050
781 4,707,051
844 4,707,052

CLASS 450

114 4,706,675

CLASS 501

4 4,707,458
90 4,707,459
98 B1 4,511,666

CLASS 502

26 4,707,460
64 4,707,461
153 4,707,462
219 4,707,465
313 4,707,466
403 4,707,467

CLASS 503

209 4,707,463
216 4,707,464

CLASS 512

11 4,707,302

CLASS 514

16 4,707,468
26 4,707,469
31 4,707,470
54 4,707,471
58 4,707,472
63 4,707,473
196 4,707,474
215 4,707,475
4,707,476
218 4,707,477
222 4,707,479
228 4,707,480
247 4,707,481
253 4,707,482
273 4,707,483
278 4,707,484
307 4,707,485
318 4,707,486
326 4,707,487
381 4,707,488
408 4,707,489
423 4,707,490
445 4,707,491
450 4,707,492
460 4,707,493
469 4,707,494
471 4,707,499
530 4,707,495
531 4,707,496
580 4,707,478
647 4,707,497
671 4,707,498

CLASS 518

713 4,707,500

CLASS 521

115 4,707,501
159 4,707,502

CLASS 522

99 4,707,503

CLASS 523

109 4,707,504
203 4,707,505

CLASS 524

89 4,707,506
99 4,707,507
106 4,707,508
147 4,707,509
281 4,707,510
311 4,707,511
504 4,707,512
4,707,513
505 4,707,514
506 4,707,515

CLASS 525

60 4,707,516
72 4,707,517
122 4,707,518
133 4,707,519
245 4,707,520
250 4,707,521
334.1 4,707,522
372 4,707,523
387 4,707,524
399 4,707,525
404 4,707,526
417 4,707,527
432 4,707,528
476 4,707,529

CLASS 526

129 4,707,530

CLASS 528

12 4,707,531
45 4,707,532
96 4,707,533
97 4,707,534
110 4,707,535
198 4,707,536
288 4,707,537
315 4,707,538
371 4,707,539
417 4,707,540

CLASS 530

324 4,707,541
371 4,707,542
402 4,707,543

CLASS 534

14 4,707,544
588 4,707,545
635 4,707,546

CLASS 540

310 4,707,547

CLASS 544

284 4,707,548
336 4,707,549
379 4,707,550
408 4,707,551

CLASS 546

176 4,707,552
273 4,707,553

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